

PHENIX WEEKLY PLANNING

3/20/2008

Don Lynch

Shutdown '08 Schedule

CM Crane Review	Mar. 22-26
Purge Flammable Gas, Magnet & DAQ Tests	Done
Remove lock-out & open shield wall	Done
Mu Trigger Review	Done
RPC Prototype C tests (in tent)	in progress
Disassemble & store shield wall & base	Done
IR Crane certification	Done
New Beam Pipe Design Review	Mar. 21
Remove Collars	Mar 24-25
Disconnect EC & move to AH	in progress
Move MMS south	Mar 26
RPC Prototype engineering & safety review	Mar 28
Inventory/test assembly of MMN scaffold	Apr
Install CM access stairs	Apr 7-11
RPC Prototype D tests (in tent)	Apr-May

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Shutdown '08 Schedule, cont'd

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Design RPC installation fixtures & FEE platforms	Apr-May
MuTrgr Platform review	mid Apr
Move CM South (MuTr Decaps?)	Apr 15 (tax day)
PC1 west work (needs planning)	Apr 1-30 or Sept.
Install CM Crane	May
Remove North access & MMN 4 lampshades	May
Install Station 1 North scaffolding	May 1
Station 1 North decaps	May
RICH air control move to DC Rack	May
Prep work for Mutrgr platforms (water/elec)	May-June
Prep work for RPC proptotype install	May-June
End of run Party	May 30
Erect MMN scaffolding	June
MMN decaps	June-July
RPC engineering & safety review	mid June
MuTrigger FEE N Install	July
HBD Install	July-August

Shutdown '08 Schedule, cont'd

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RPC prototype gas system	July
Move shielding for RPC prototype installation	July
RPC prototype cable routing & support	July
Modify crystal palace & vapor barrier	July
Install MuTrigger FEE N platform	July
RPC prototype install	August
Install RPC prototype rack in tunnel south	August
Install Mutrigger FEE's in MMS for RPC test	August
Install MuTrigger FEE South platform	August
Install MuTrgr N&S rack cooling & electric	August
Install MuTrigger N cooling water & air	August
Replace tunnel shielding	Sept
Connect electronics/gas/water/air for RPC	Sept.
Install MuTrigger N& S racks	Sept.
DC East?/West Repairs	Oct.
Remove all installation equipment	Oct.
Prep for run 9	Oct
Close shield wall start shifts	Nov
Start physics	Dec.

- Mu Trigger FEE N & S Done
- New Beampipe Review 3/21
- CM Crane & MMN Scaffolding & Station 1 Scaffolding (DESIGN IN PROCESS) (3/24-3/26)
- RPC Prototype 3/27 (informal engineering) 3/28 AM mechanical design PM safety (gas, electrical, installation)
- MuTrigger N & S rack platform 4/21-5/2 (On deck for design)
- RPC Stations 1, 2 and 3 ~ 6/22-6/20
- VTX/FVTX review ~ 6/1-8/31
- NCC Review ~ 6/1-8/31
- MMS scaffolding (< 2009)

Work Permit Requirements

- Standard Shutdown Commencement tasks (covered by approved procedures) Done
- PC1 Repairs
- CM Crane Installation
- MuTrigger FEE Upgrade (North & South) & MuTr Decaps, (including confined space for MMS & MMN and scaffold installation)
- RPC Prototype Installation
- HBD re-installation
- MuTrigger FEE rack platform installation
- (More will be needed - to be added to the list as appropriate)

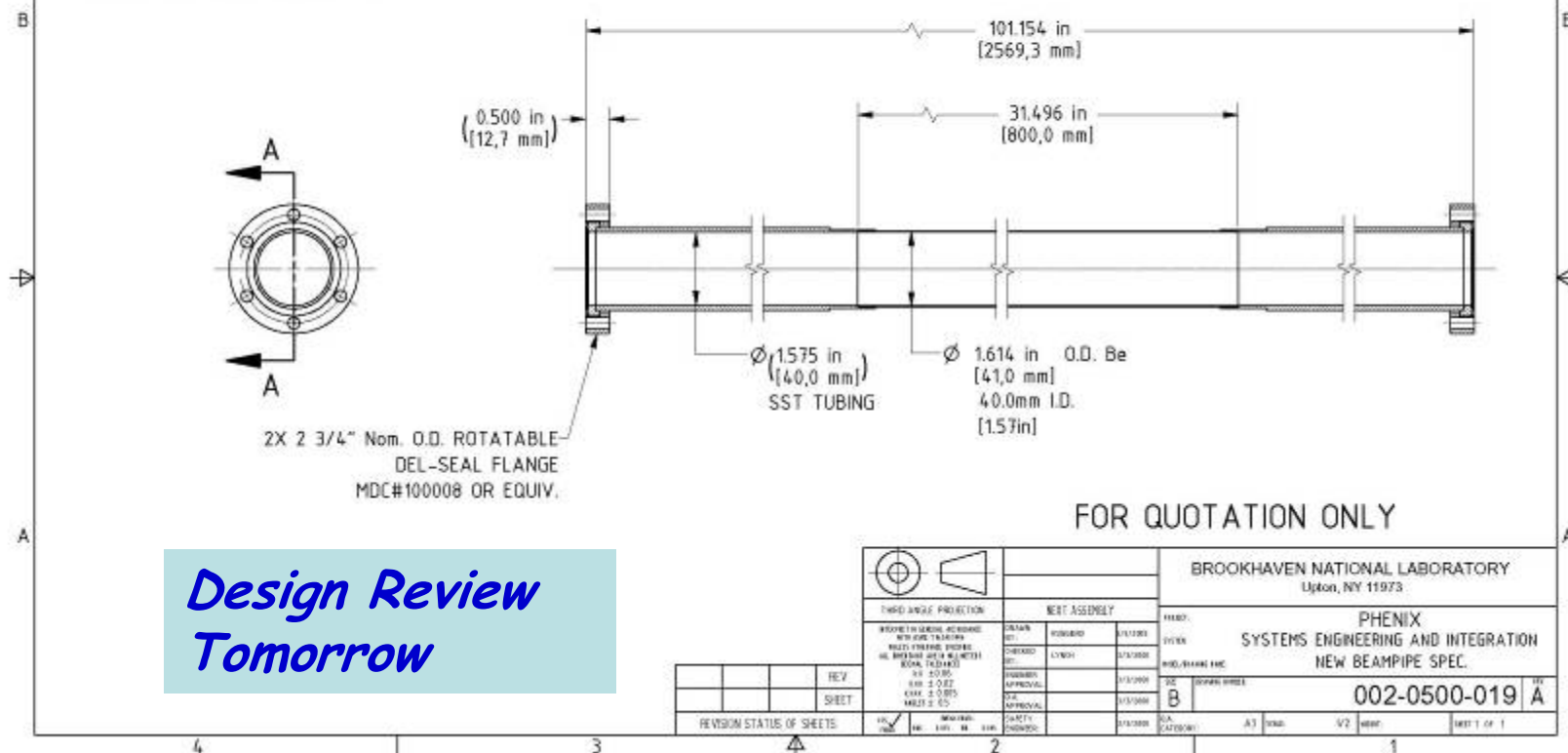
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New Beampipe Design & Review

NOTES:

1. MATERIAL: SST & BERYLLIUM PS-200 AS SPECIFIED.
2. BAKEABLE TO 300° C
3. VACUUM TIGHT TO 1×10^{-10} atm-cm³/sec.
4. DETAIL DESIGN AND FABRICATION PROCEDURE TO BE APPROVED BY BNL AFTER CONTRACT AWARD.

REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
A			

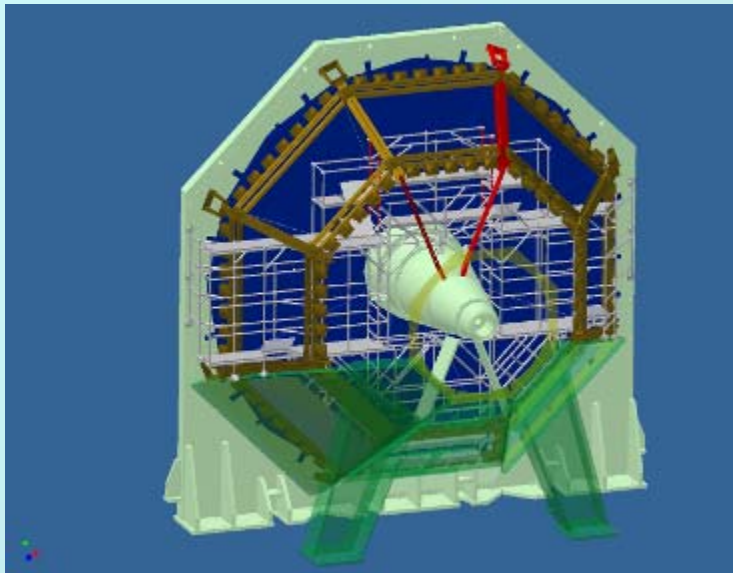
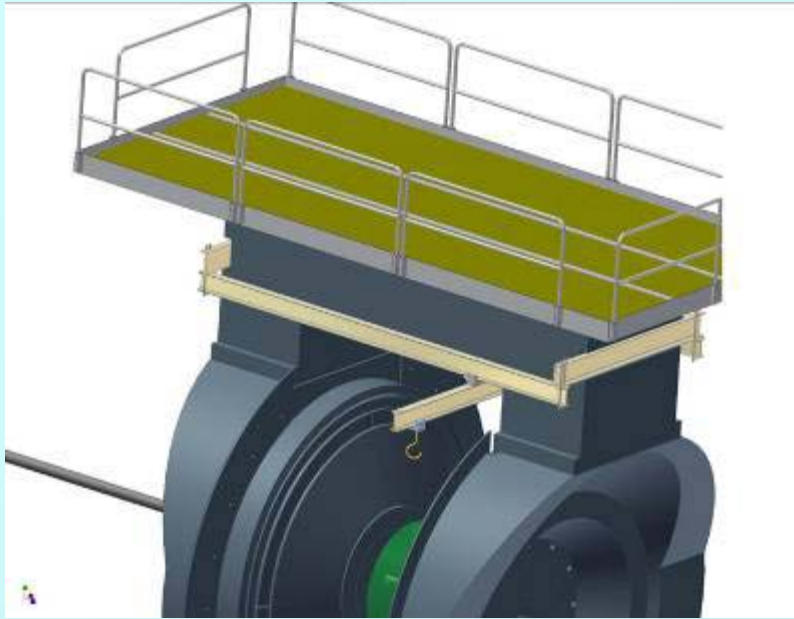


*Design Review
Tomorrow*

Combined CM Crane, MMN & Station 1 scaffolding Review

PHENIX

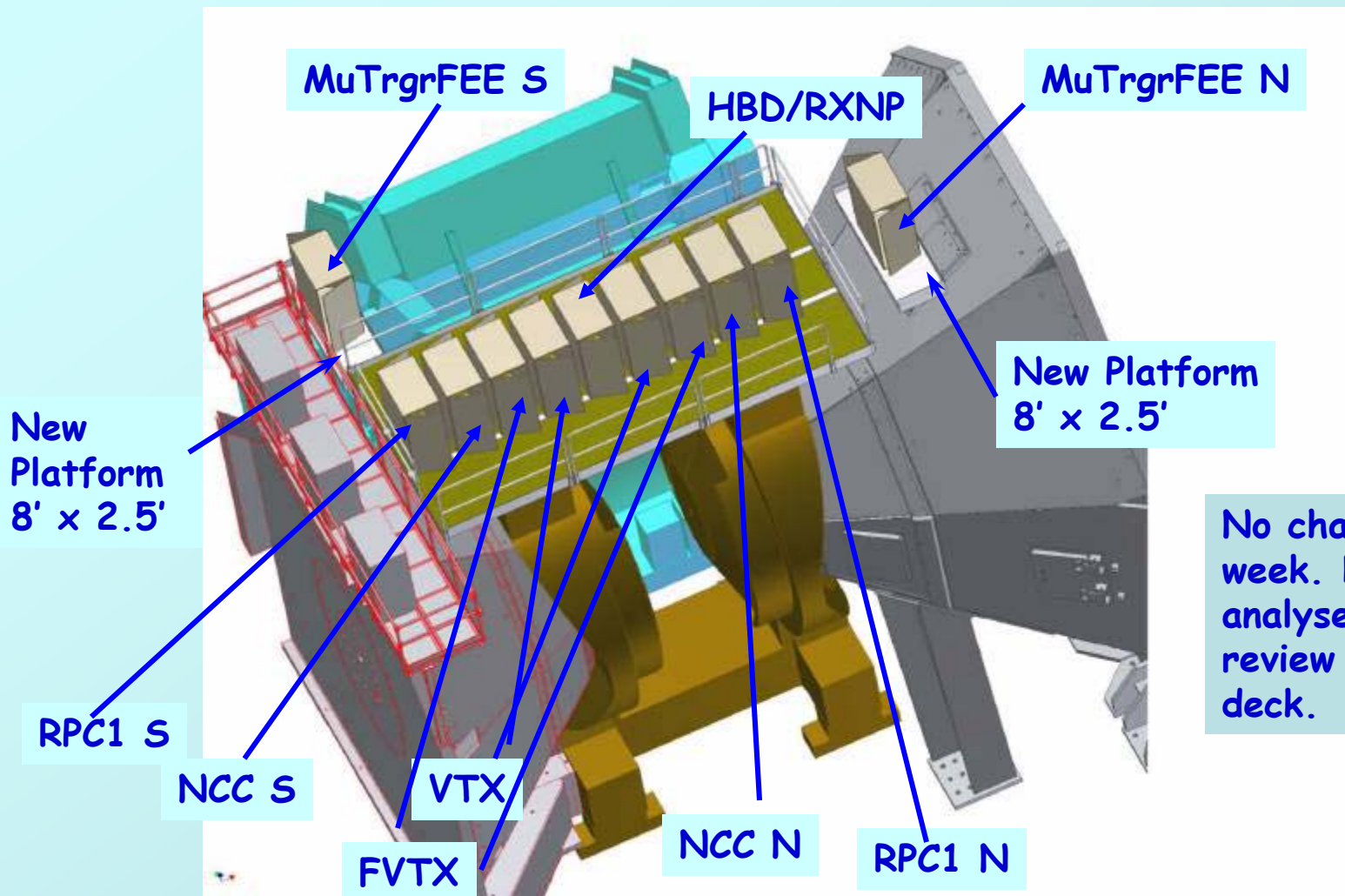
TECHNICAL SUPPORT NOON



Crane and MMN analyses submitted,
Station 1 analyses this week. Expect
review next week

New Rack Allocations

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No changes this week. Design, analyses and review are on deck.

MuTrigger FEE

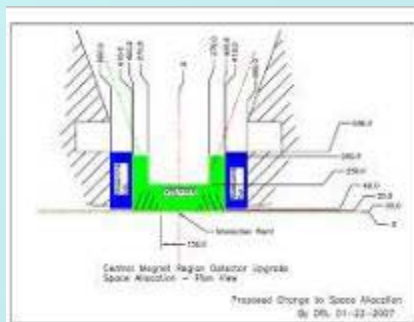
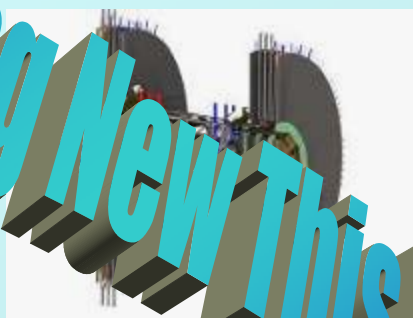
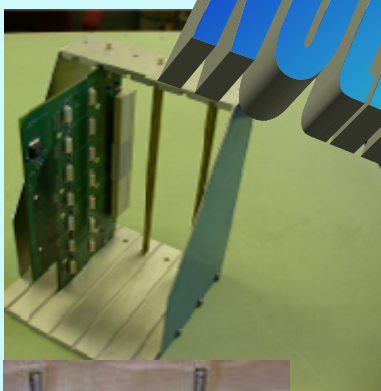
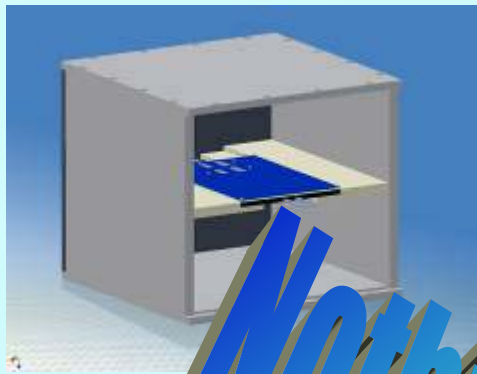


C-A Safety review done

Action items being addressed.

Project is on schedule.





Other Work

- VTX, FVTX and NCC prototype support
 - Integration
 - Physical and Rack space
 - Infrastructure upgrades
- New Counting House Door
- VTX Prototype for run 8 ?

STATION 1 THIN PLATE ABSORBER INSTALLATION CONCEPT

By: Chris Daurer
and Larry Bartoszek

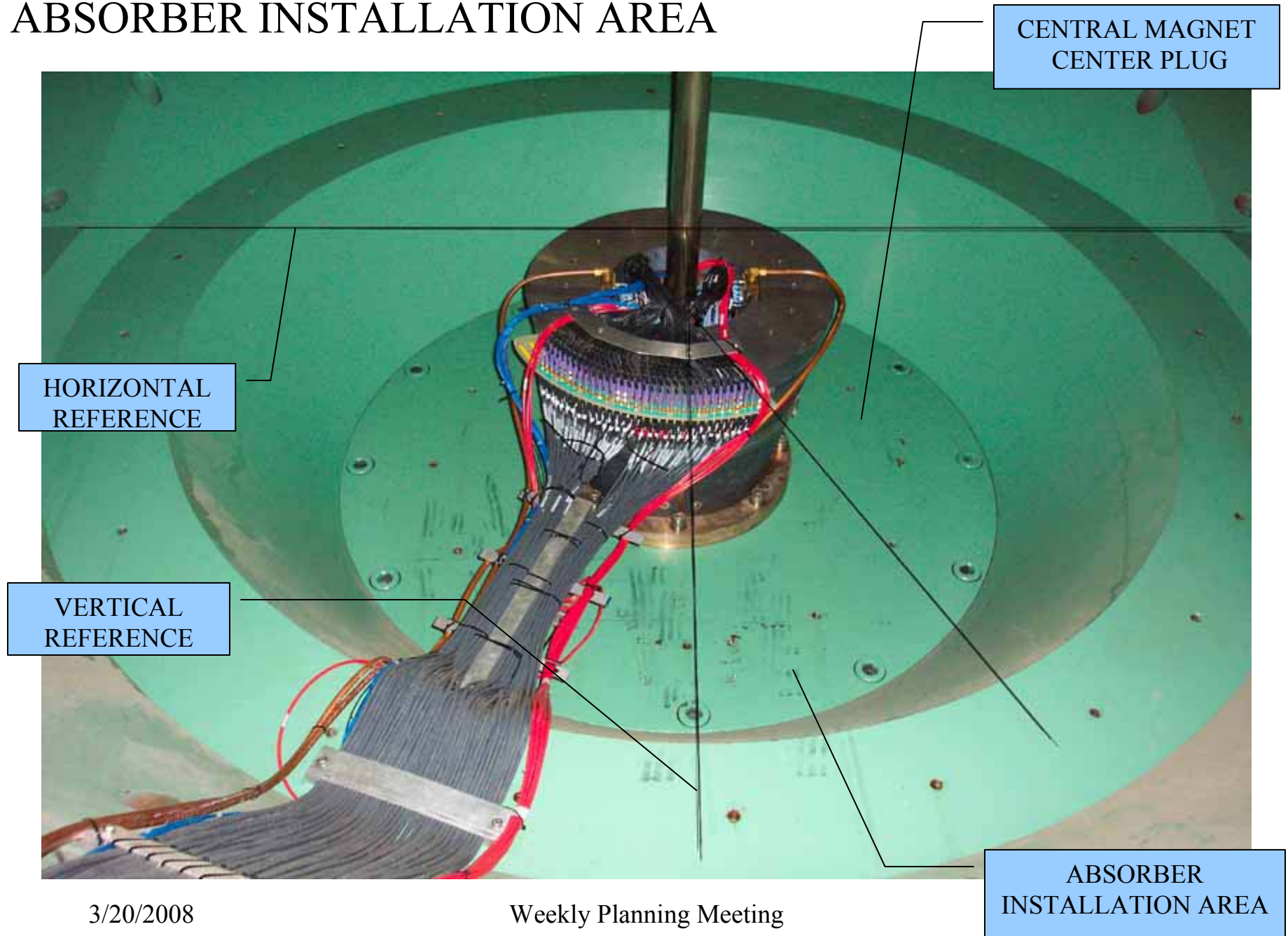
BARTOSZEK ENGINEERING

03-17-2008

Concept:

- The goal is to develop a way to install 14” of steel absorber made up of 56 plates which are $\frac{1}{4}$ ” thick against the center plug of the central magnet.
- My concept is to use two 17.5” long pins threaded into the Center Plug of the central magnet to support the 56 plate stack. I have chosen 1” diameter pins for this concept, but they could be larger pending analysis.
- Initially the concept was rejected because the BBC taper makes it impossible to slide the $\frac{1}{4}$ ” plates directly on the the pins in the Z direction.
- My solution is use large thru-holes in the plates to allow the plates to maneuver into position, then plugging the holes with donut shaped plugs of the same thickness. See the following slides.

ABSORBER INSTALLATION AREA



3/20/2008

Weekly Planning Meeting

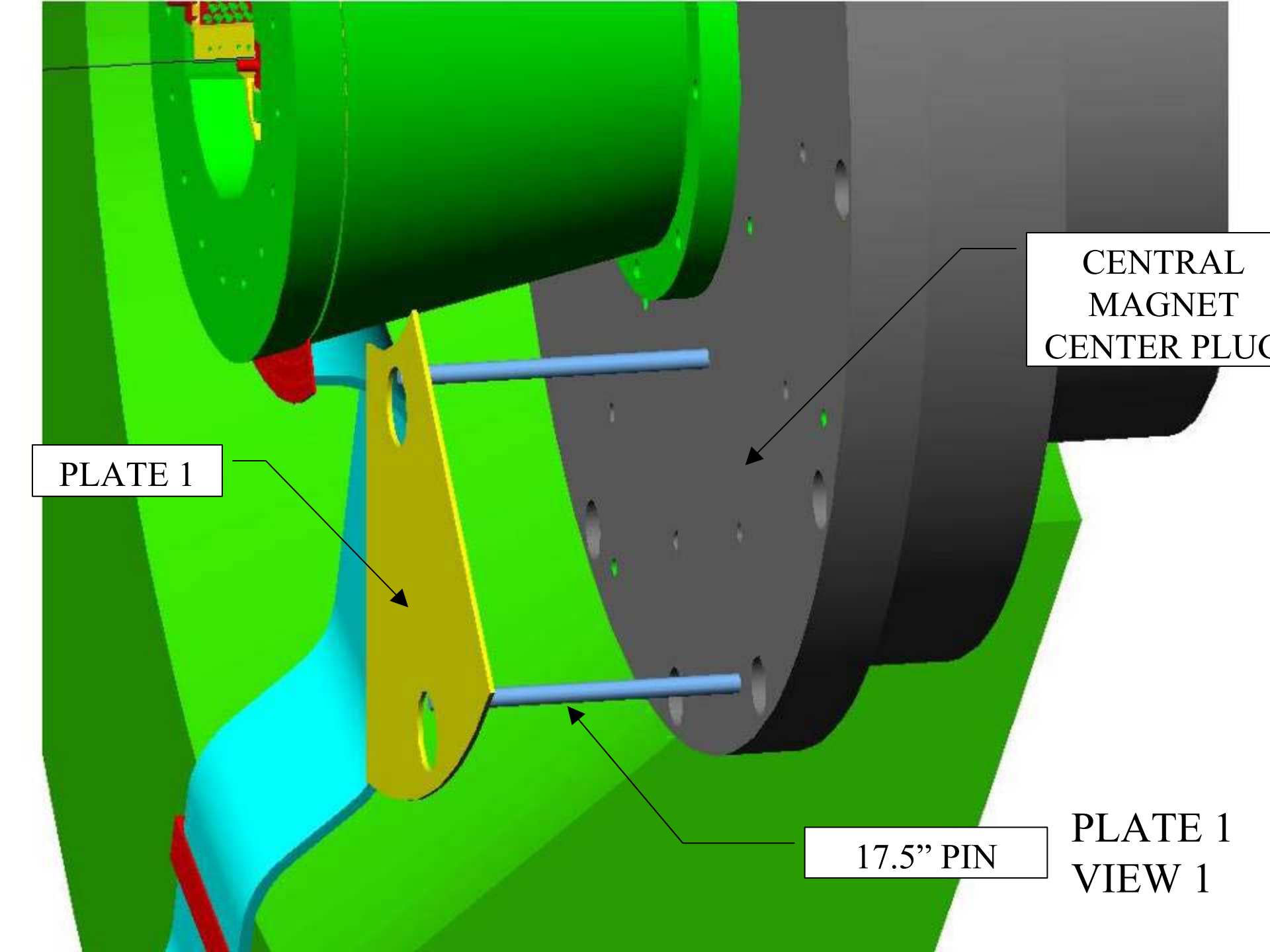


PLATE 1

CENTRAL
MAGNET
CENTER PLUG

17.5" PIN

PLATE 1
VIEW 1

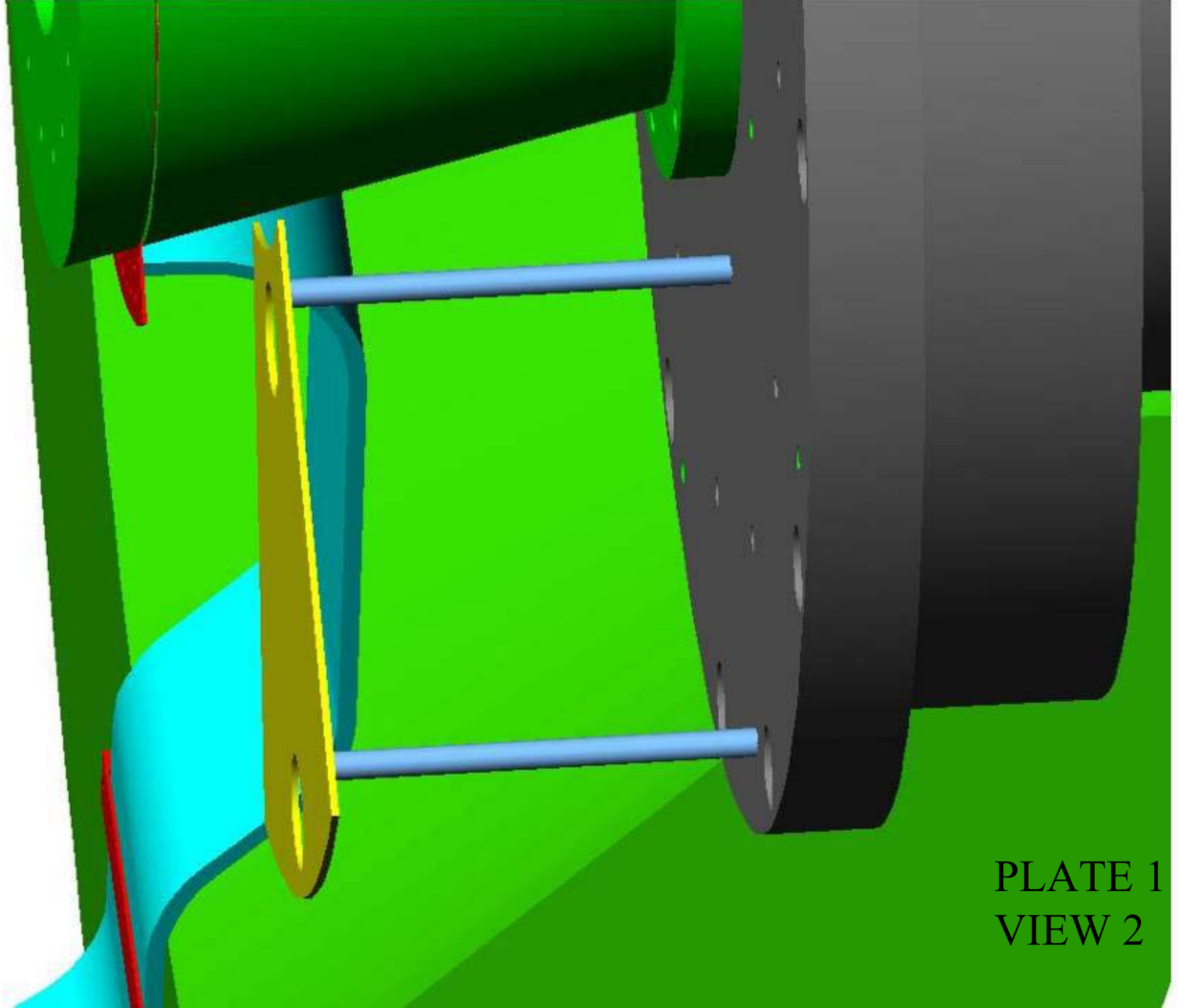


PLATE 1
VIEW 2

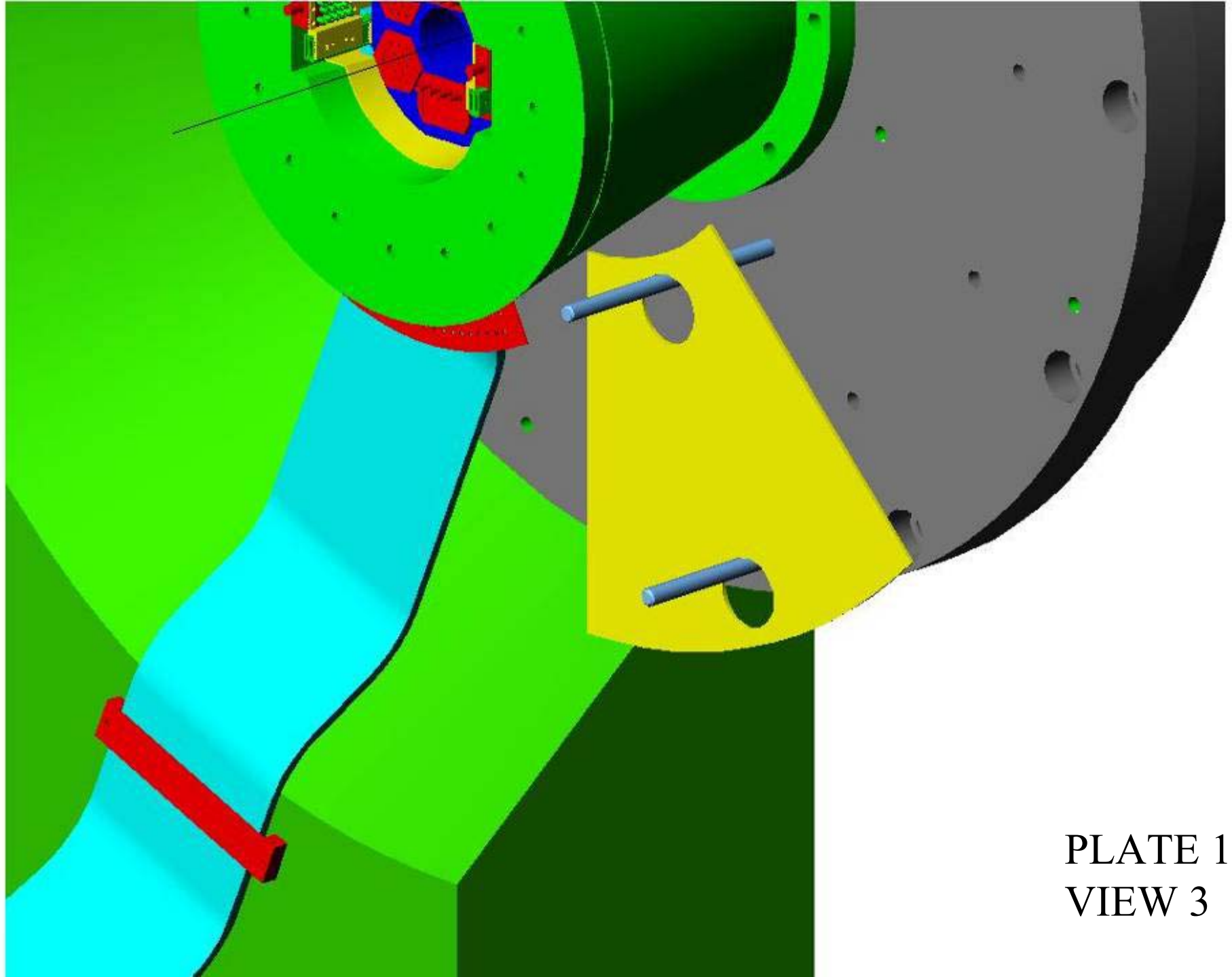


PLATE 1
VIEW 3

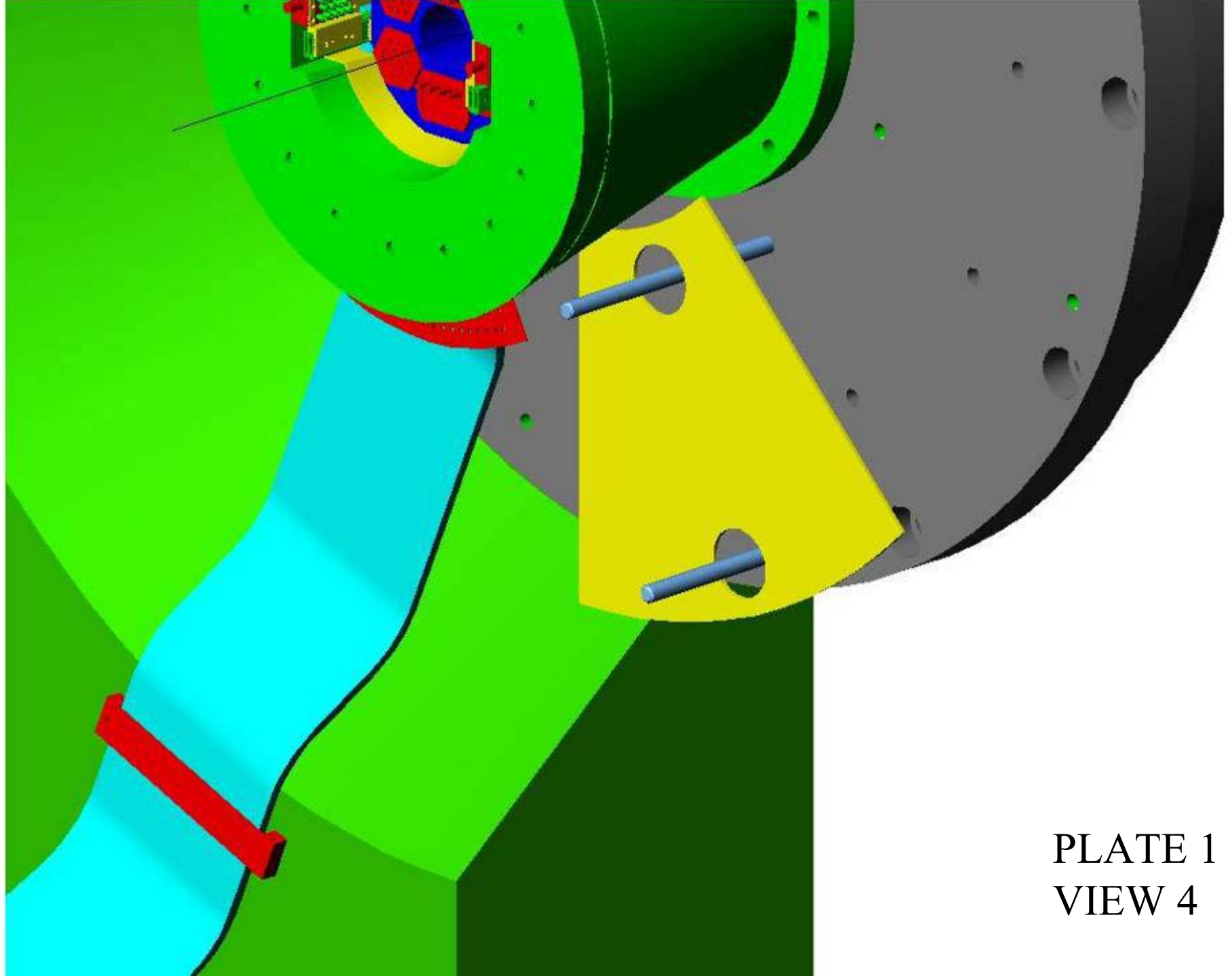


PLATE 1
VIEW 4

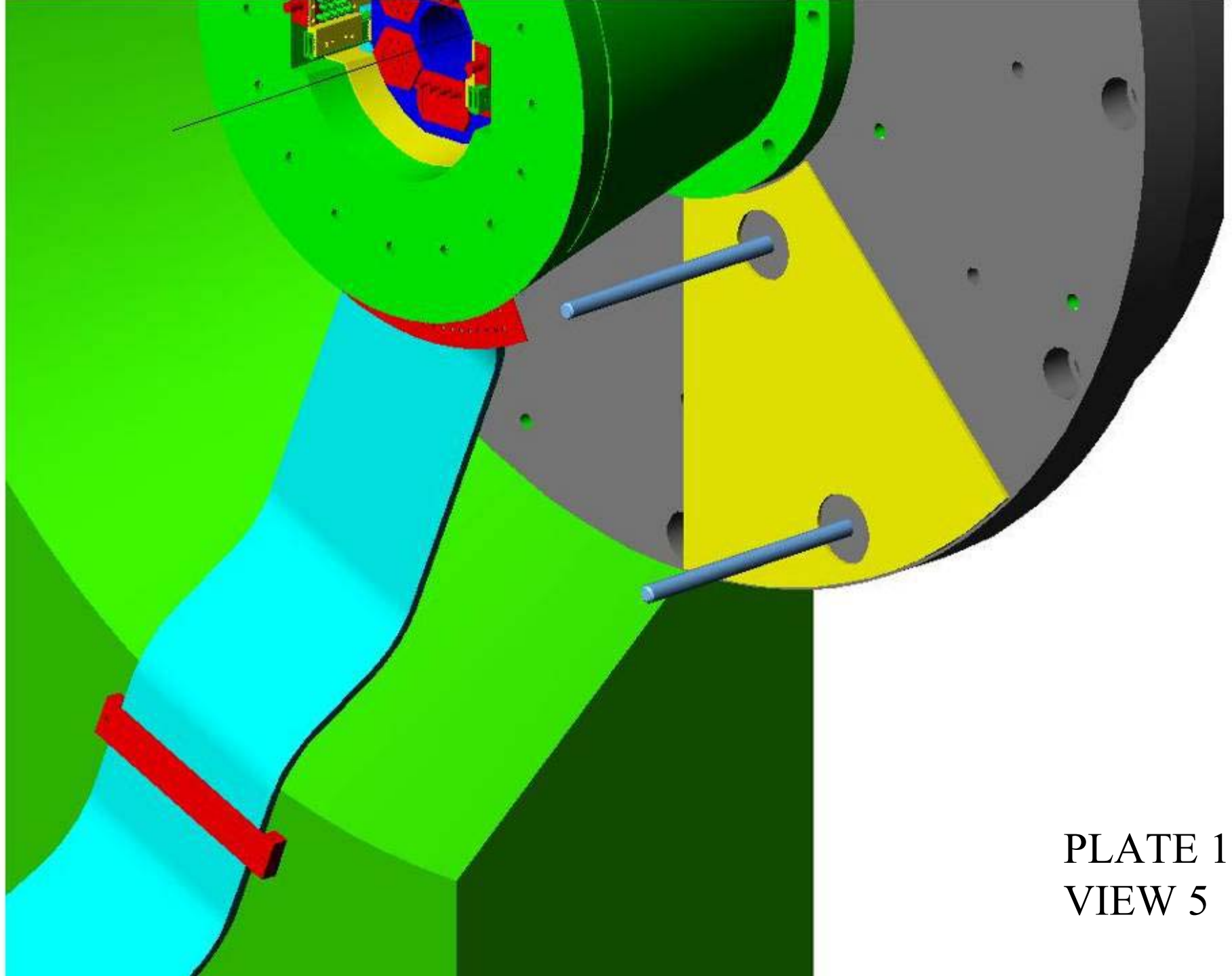
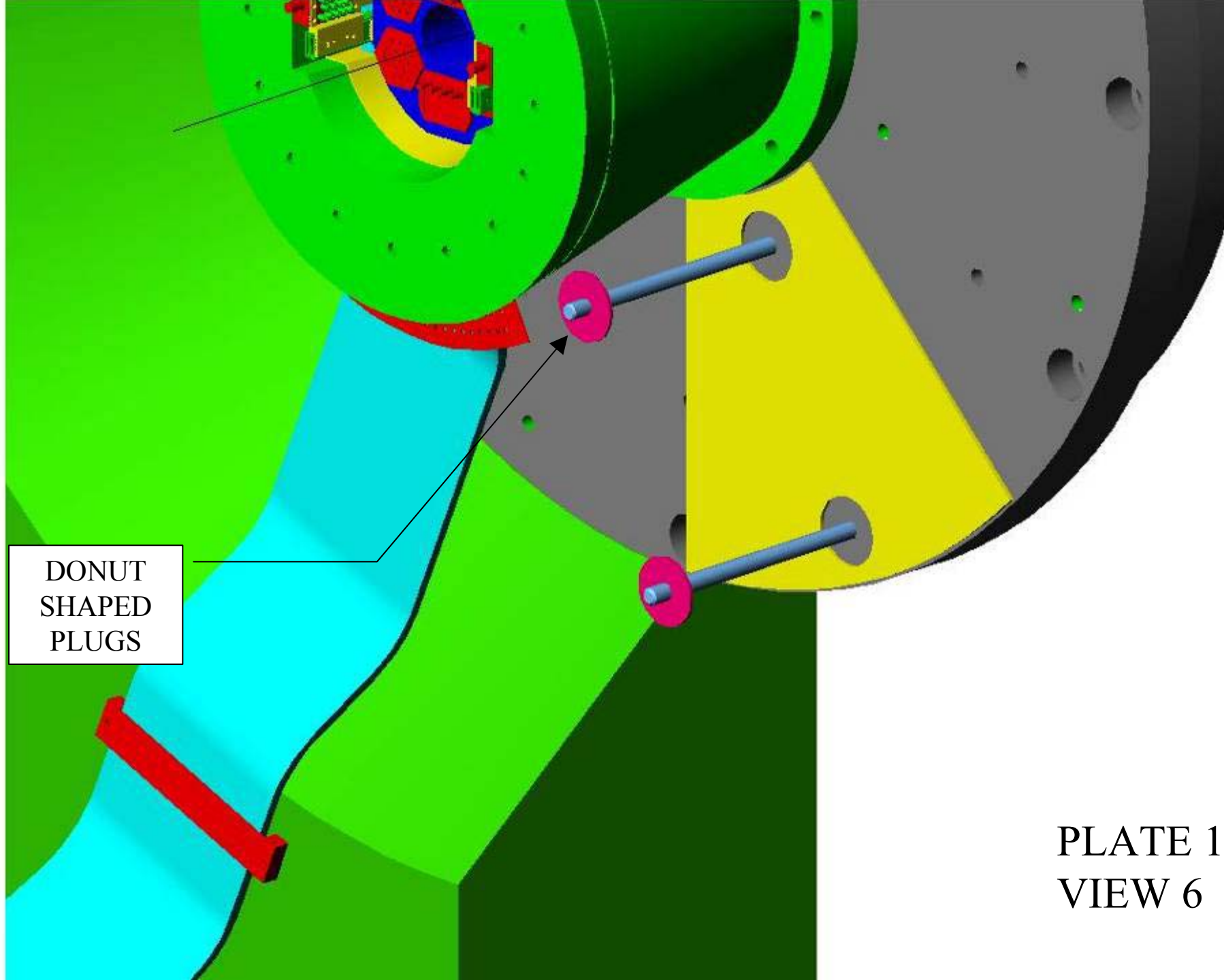


PLATE 1
VIEW 5



DONUT
SHAPED
PLUGS

PLATE 1
VIEW 6

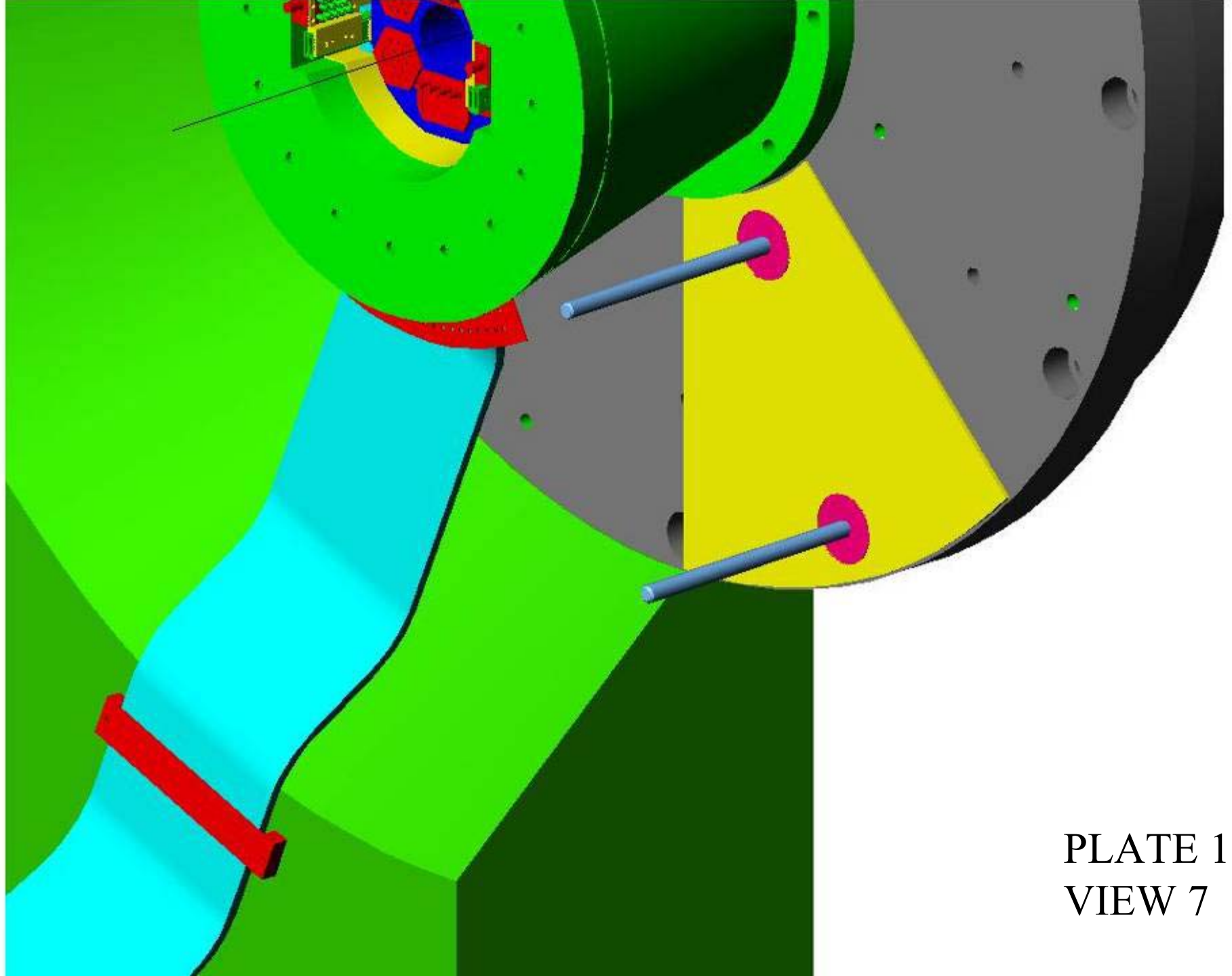
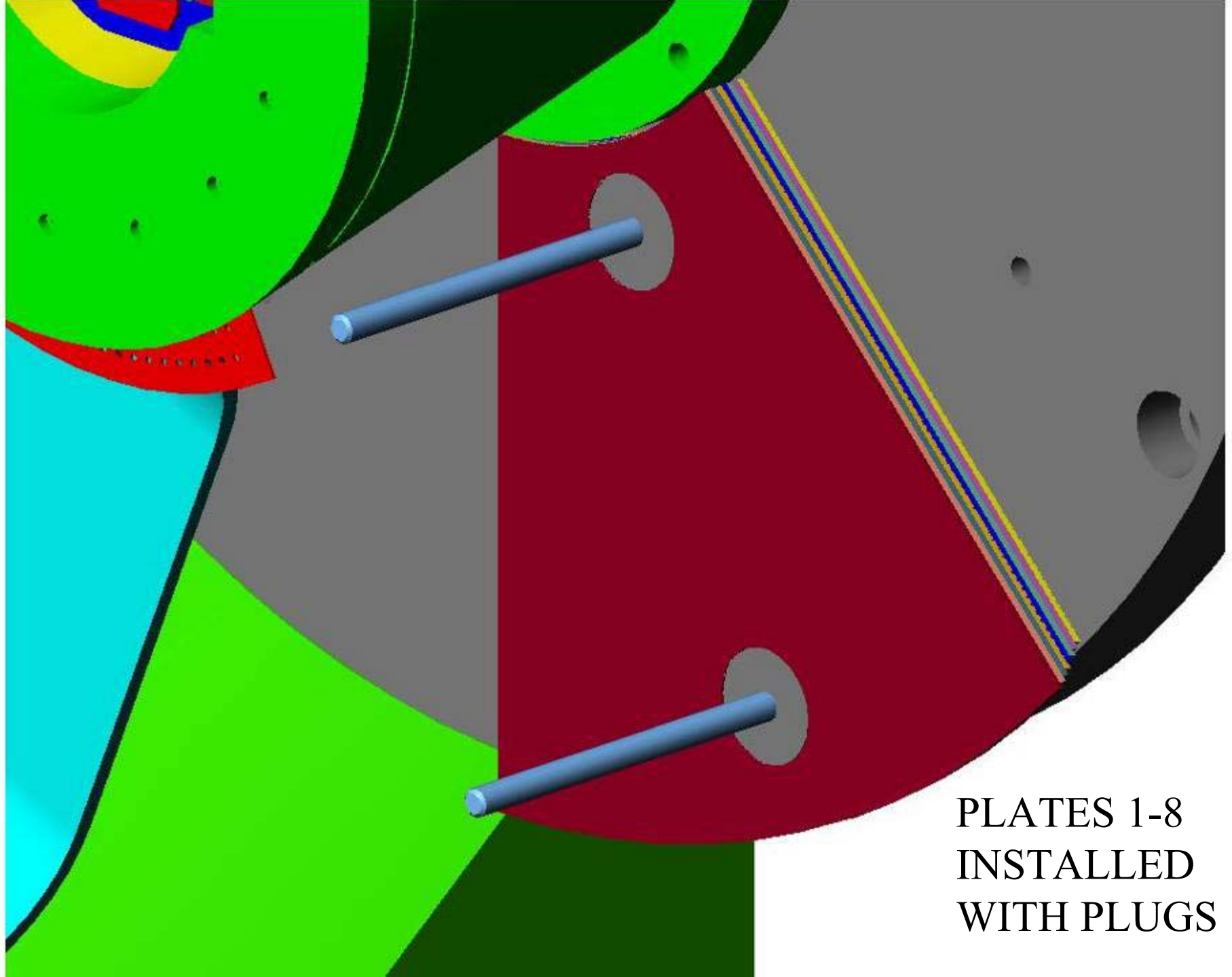


PLATE 1
VIEW 7



PLATES 1-8
INSTALLED
WITH PLUGS

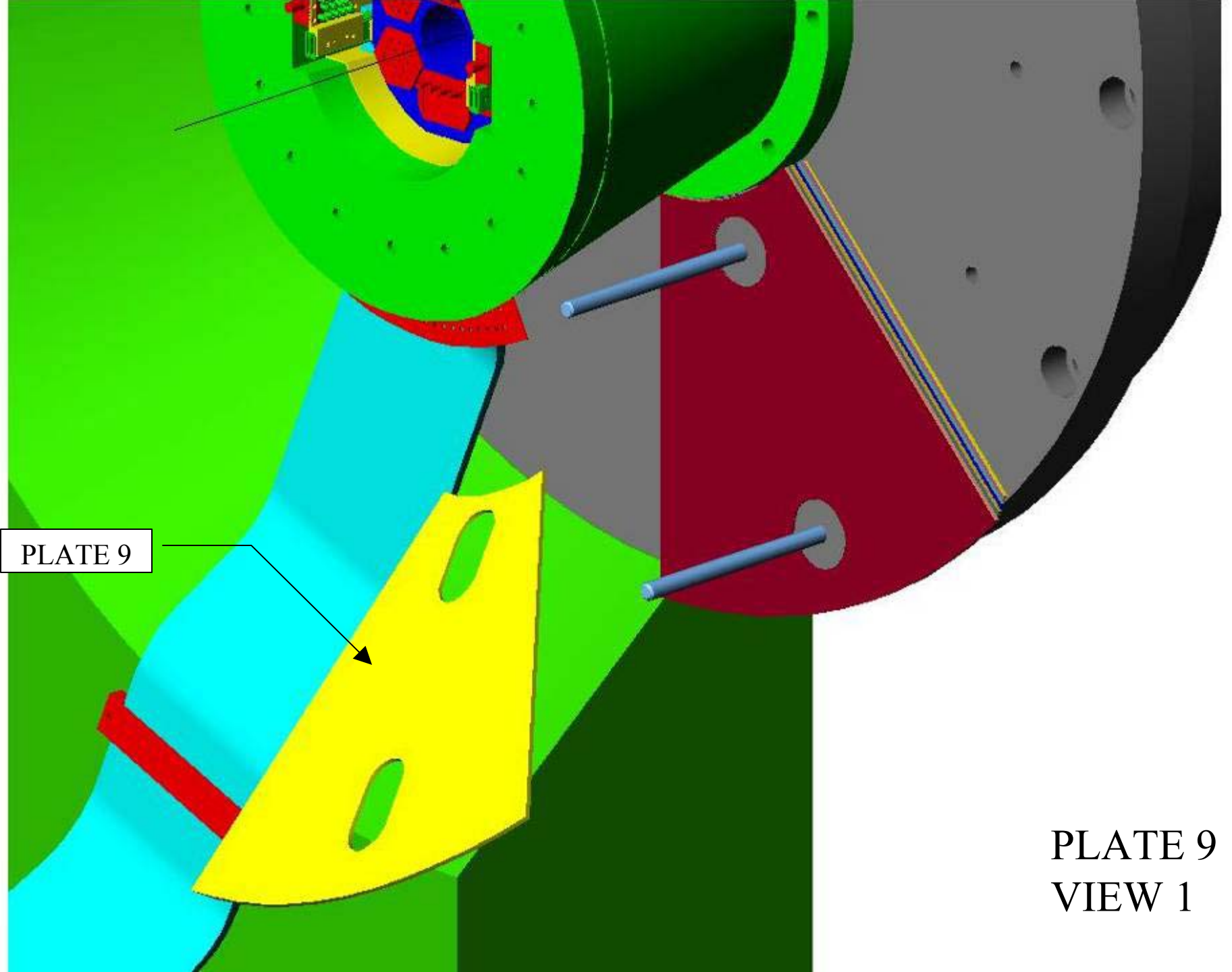


PLATE 9

PLATE 9
VIEW 1

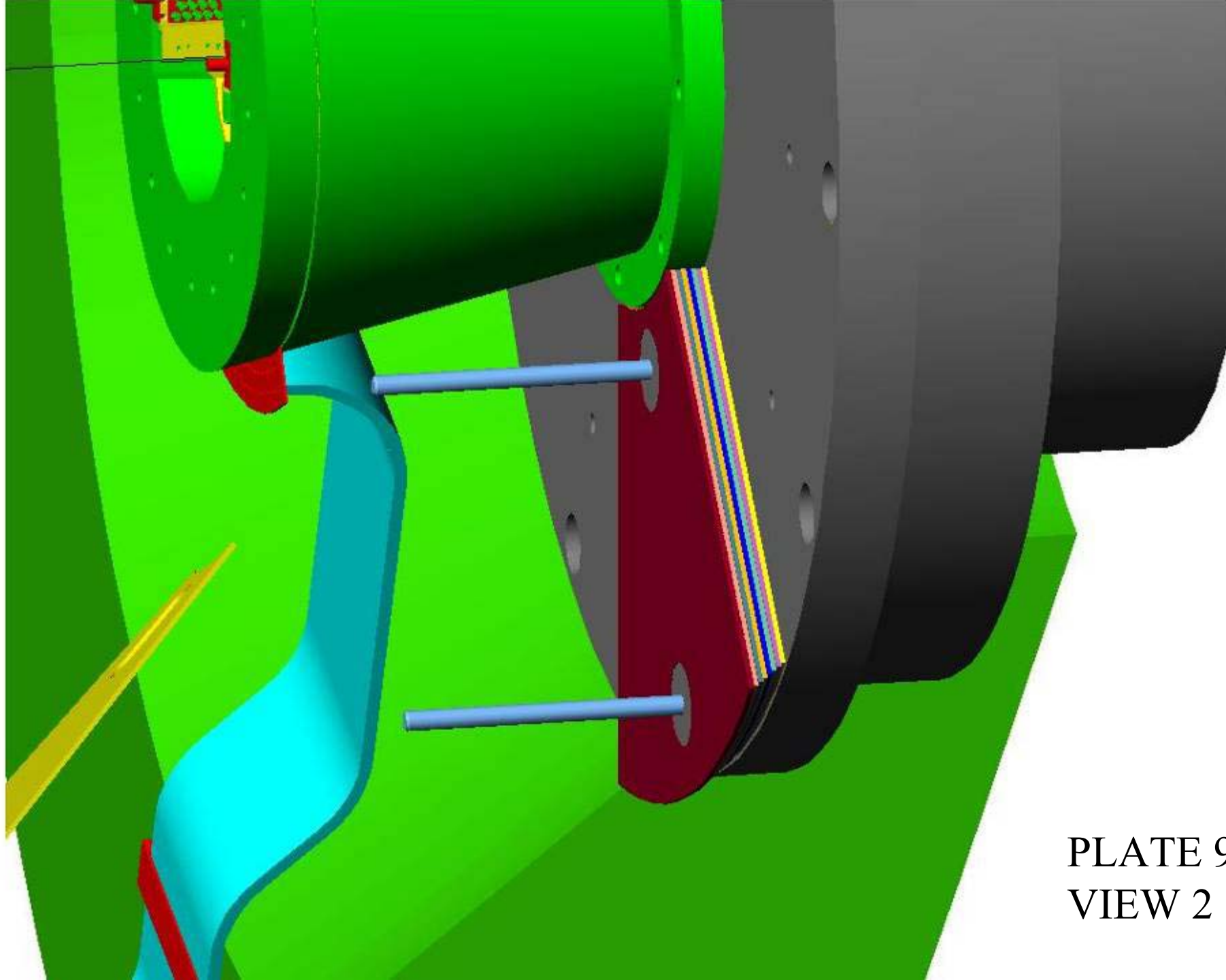


PLATE 9
VIEW 2

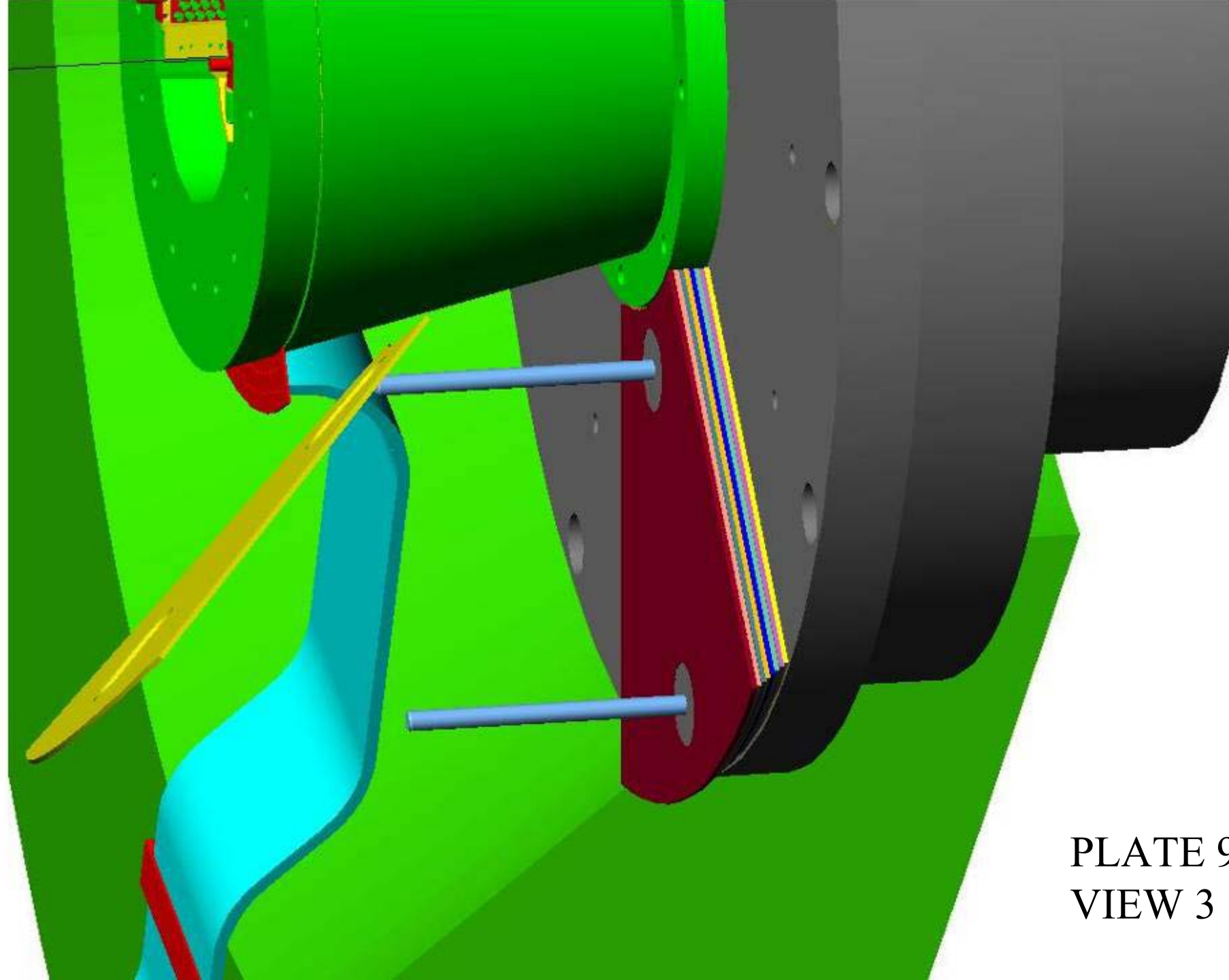


PLATE 9
VIEW 3

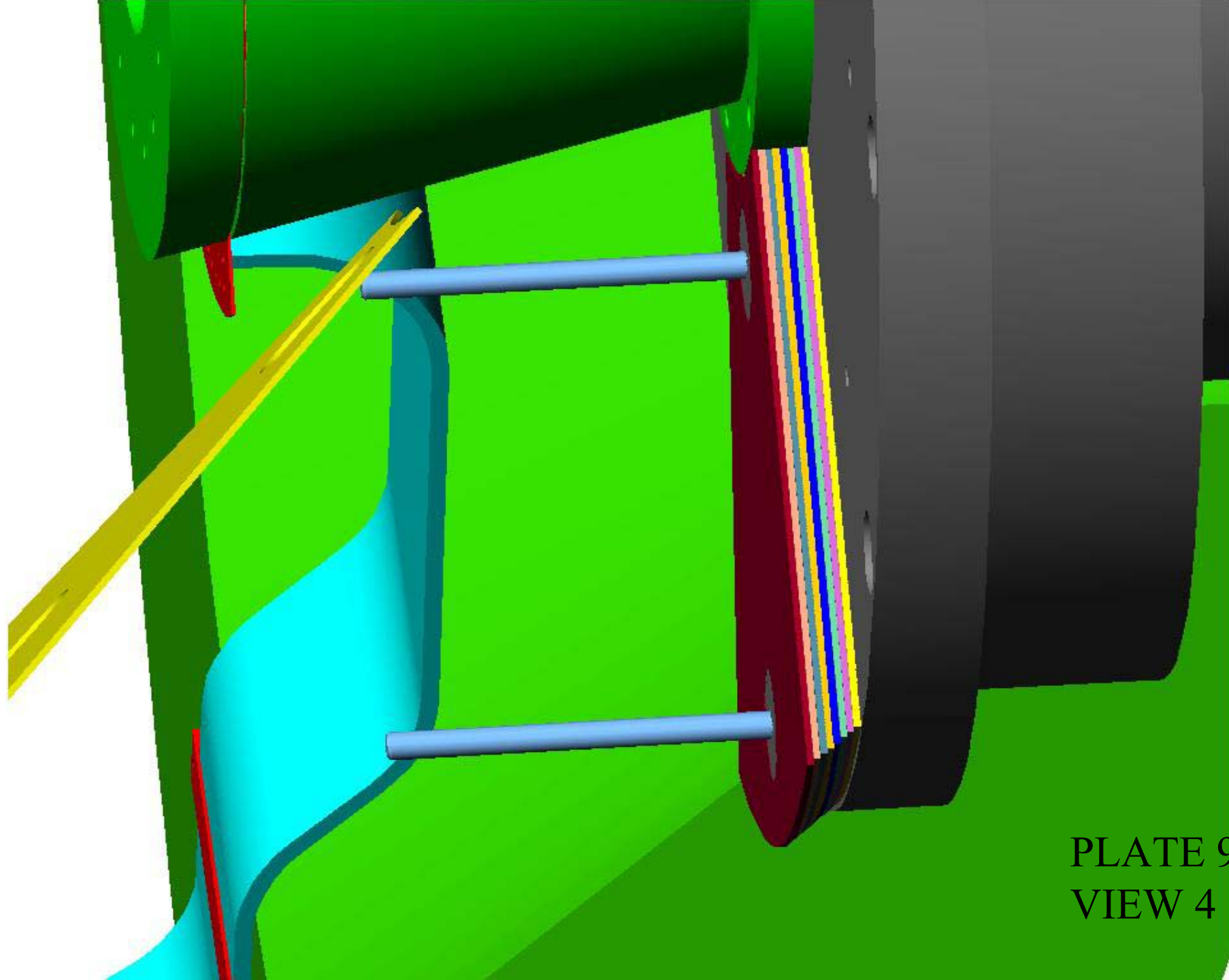


PLATE 9
VIEW 4

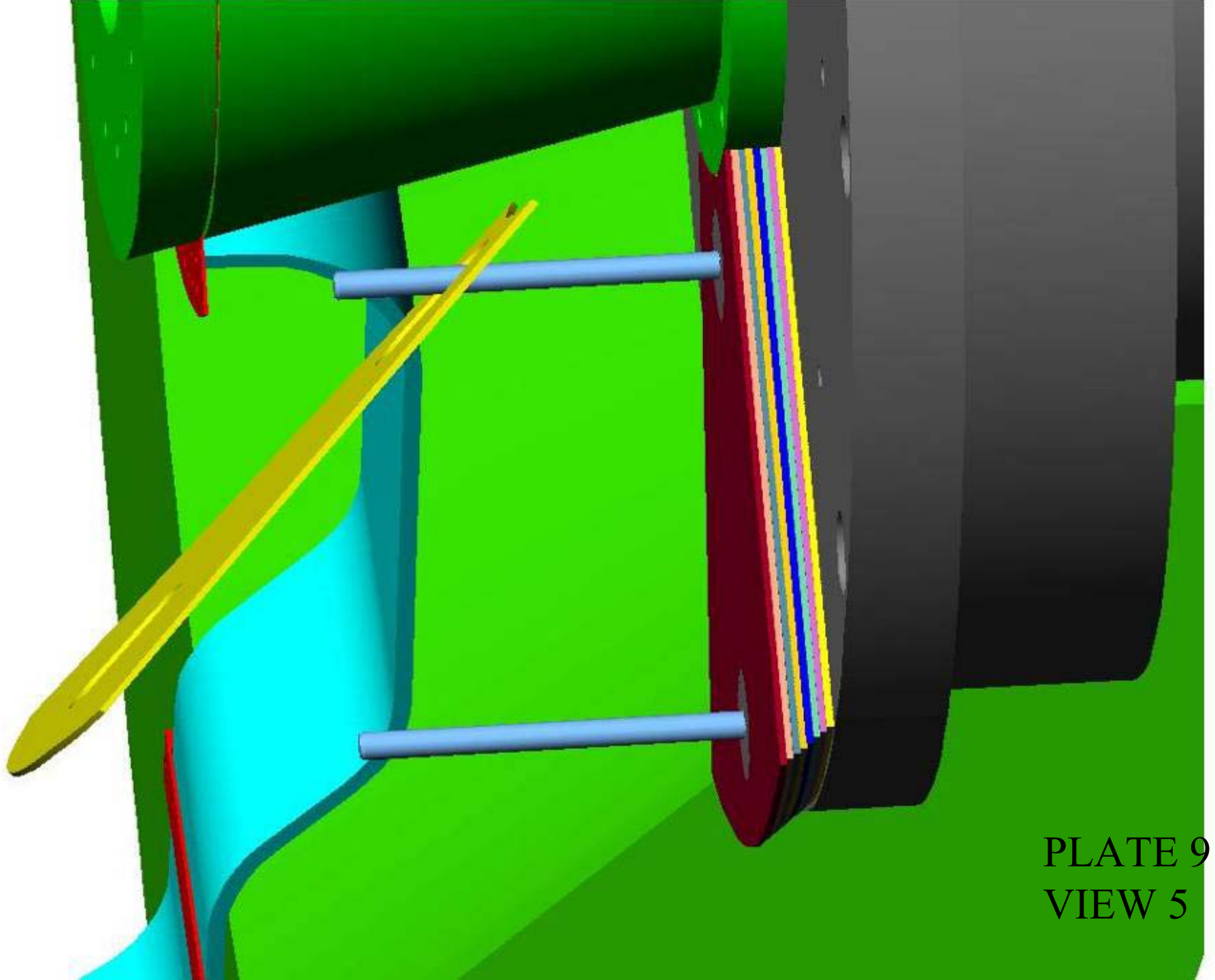


PLATE 9
VIEW 5

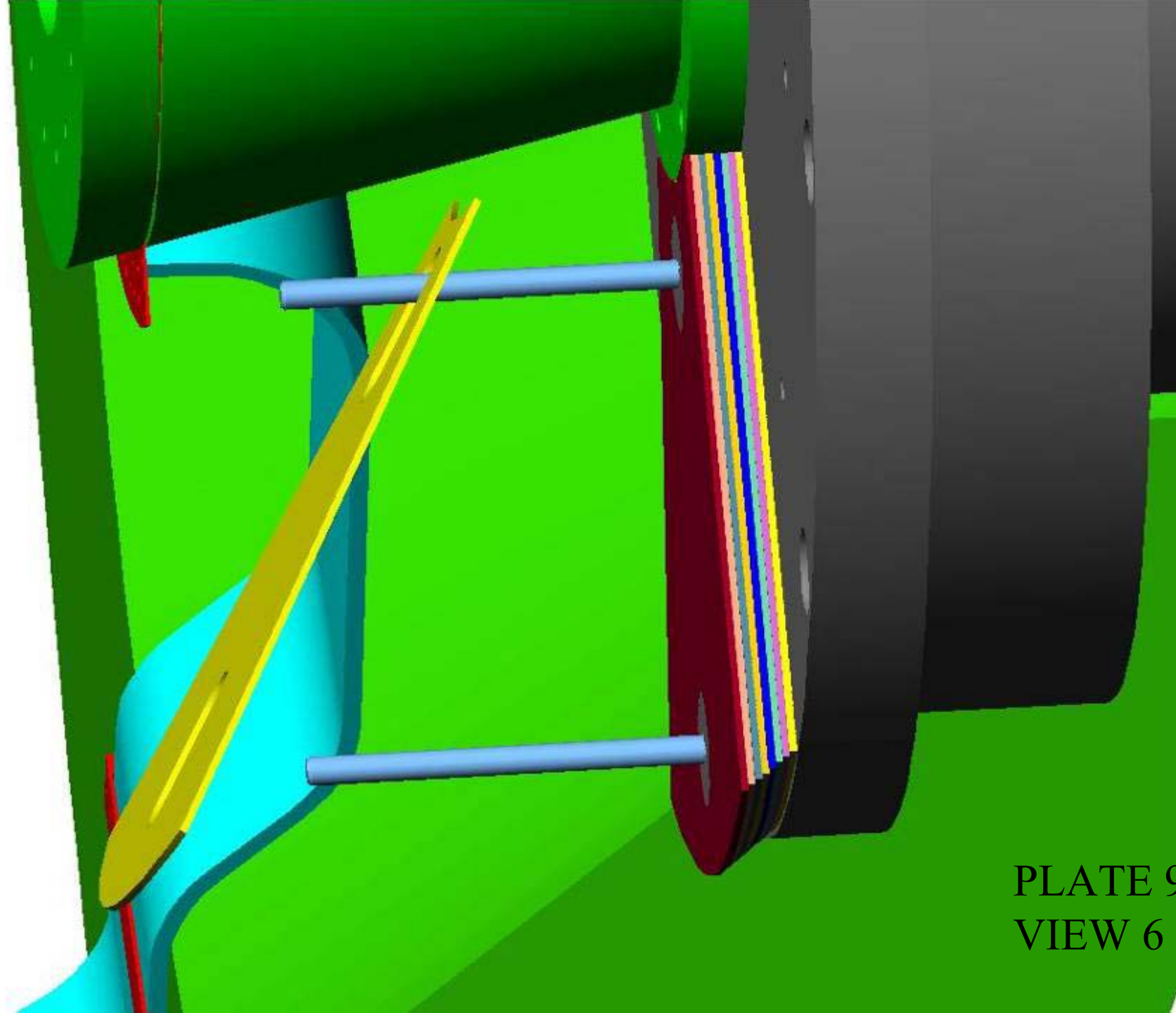


PLATE 9
VIEW 6

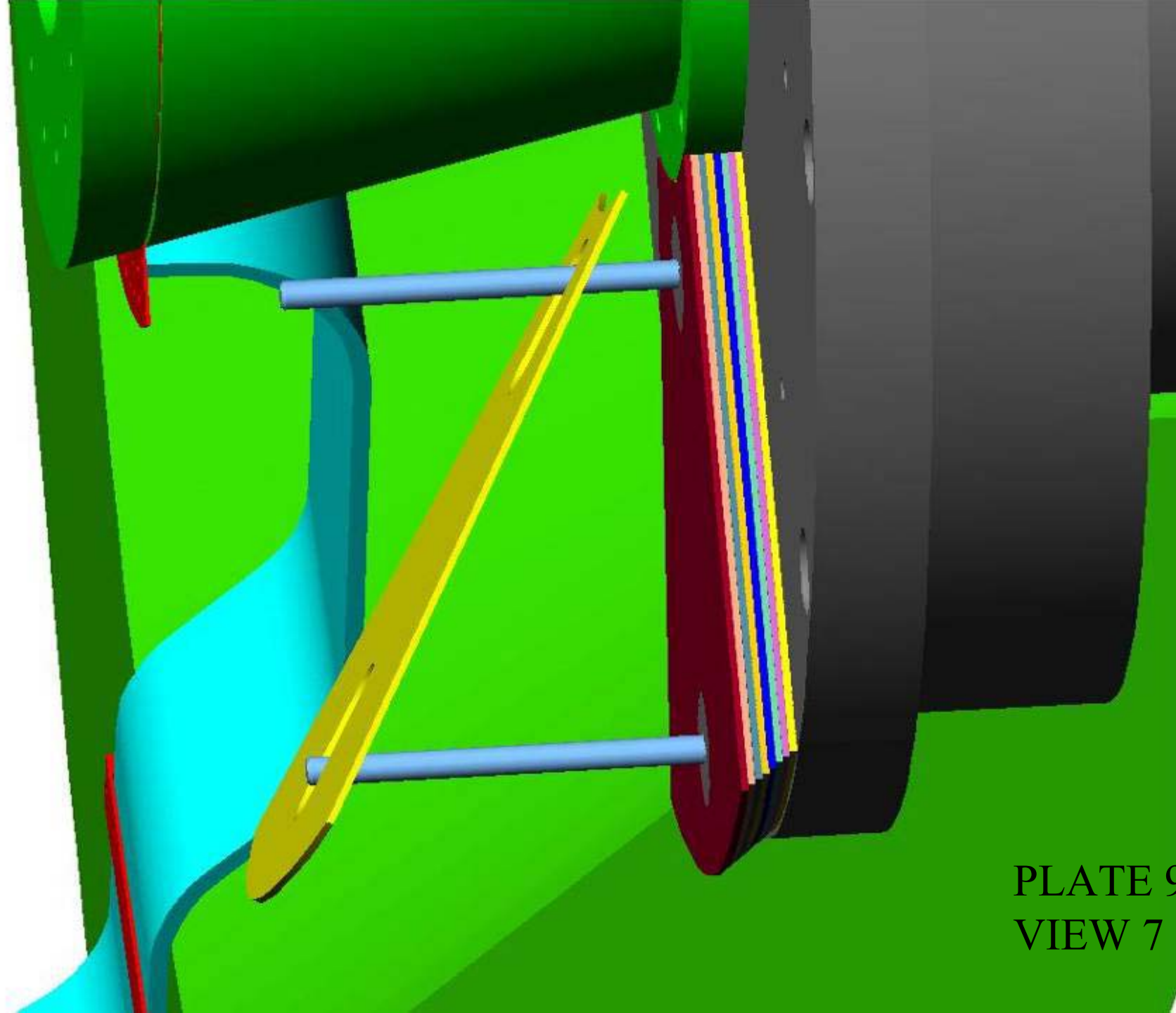


PLATE 9
VIEW 7

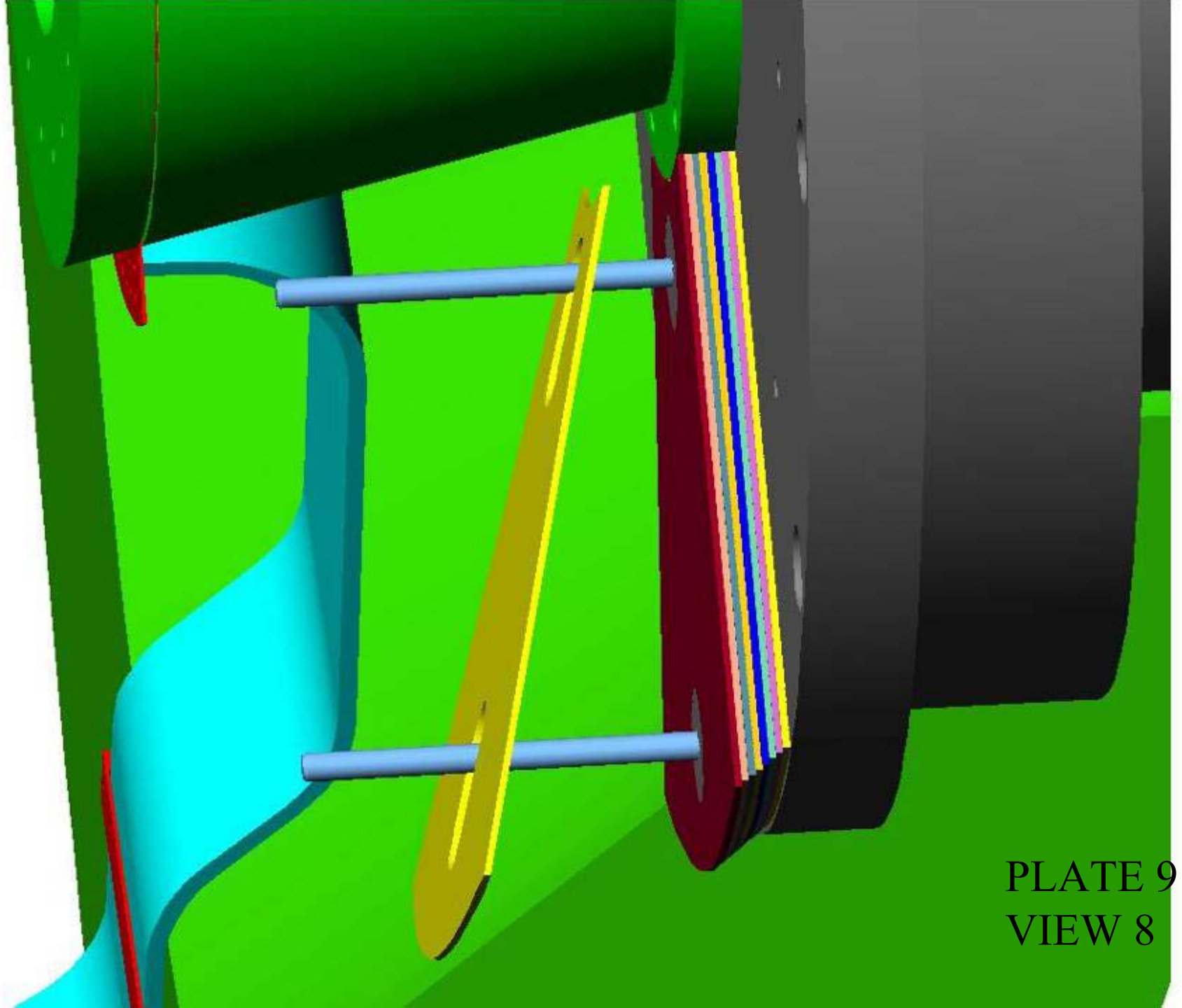


PLATE 9
VIEW 8

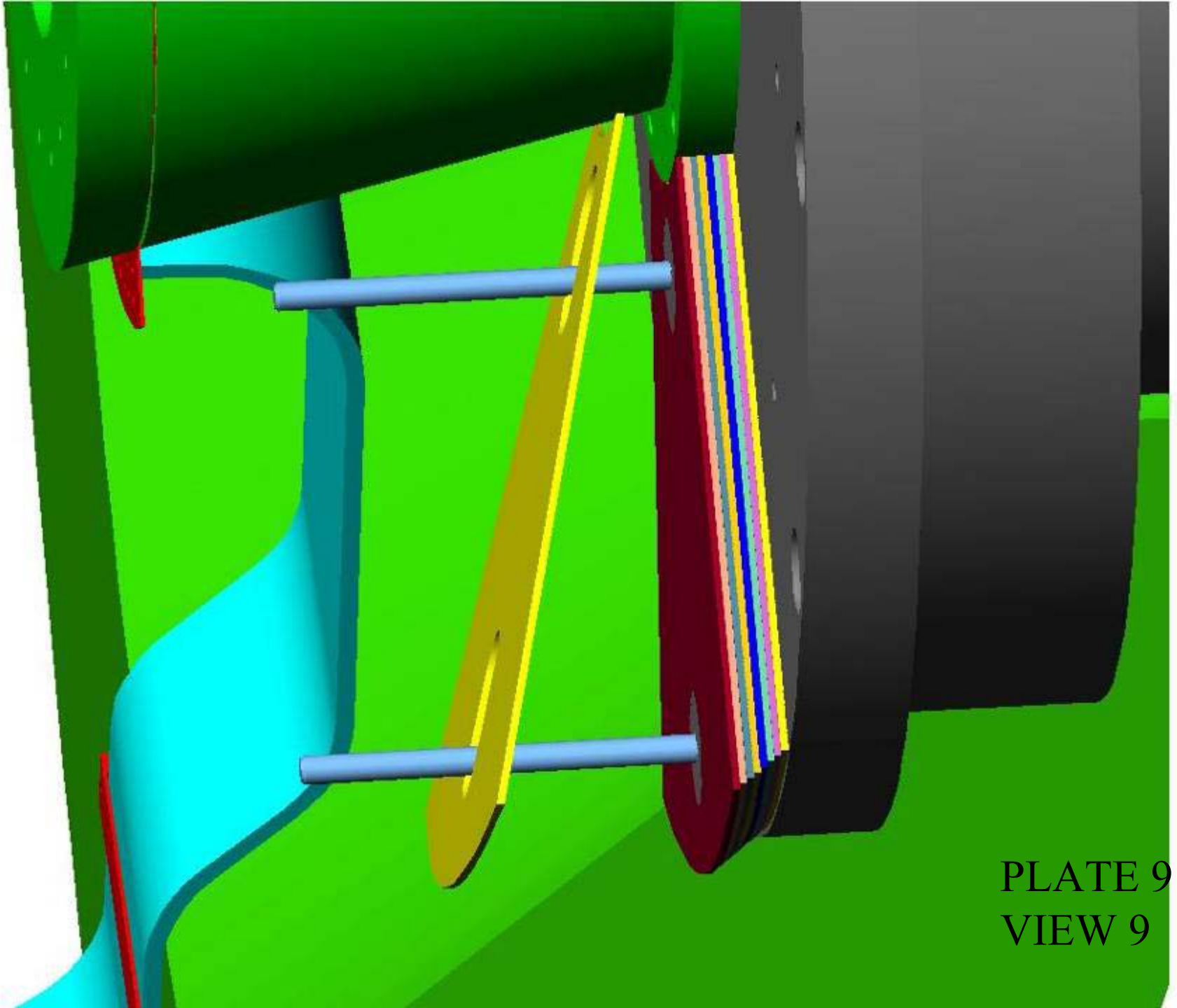


PLATE 9
VIEW 9

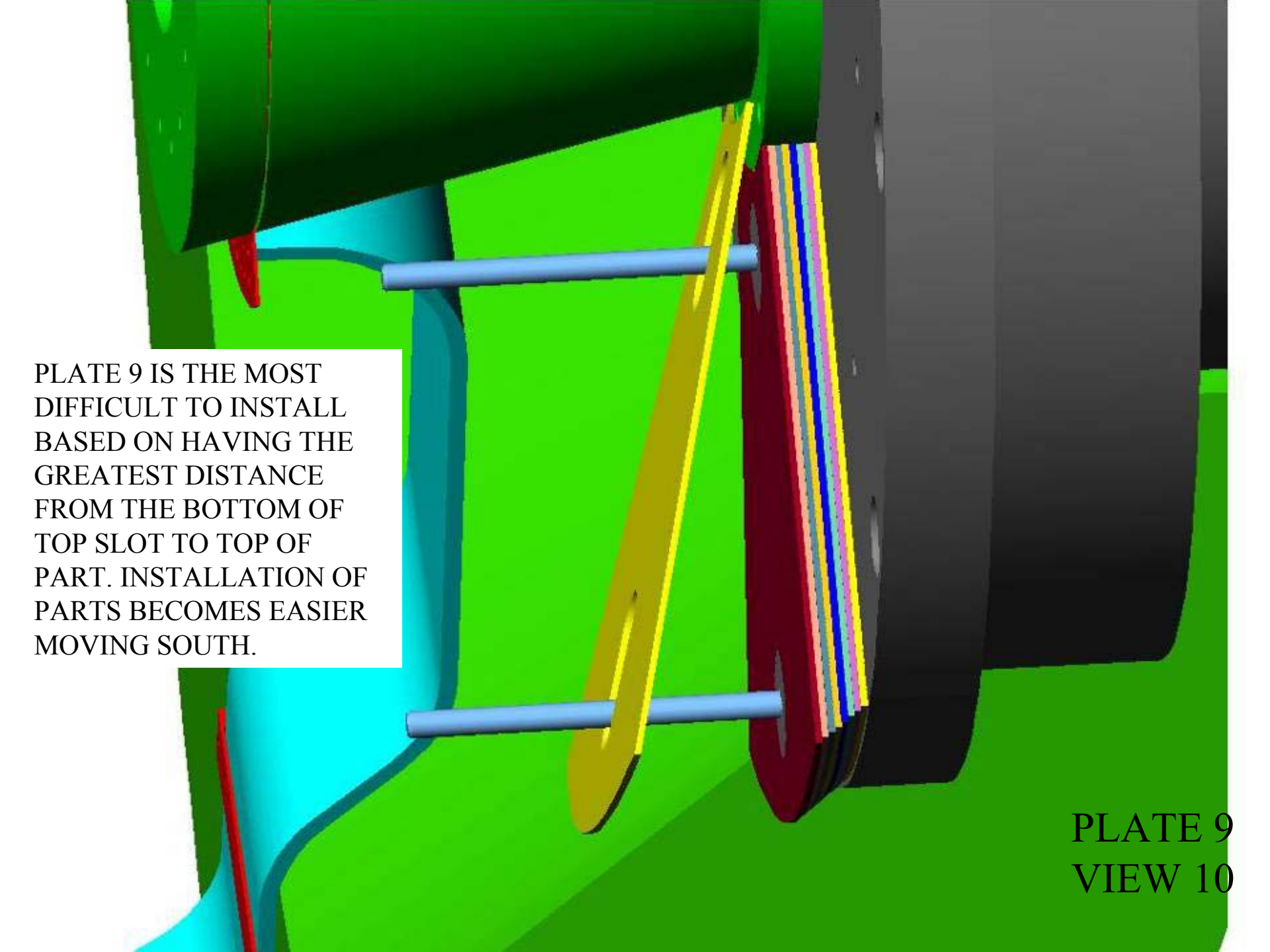


PLATE 9 IS THE MOST
DIFFICULT TO INSTALL
BASED ON HAVING THE
GREATEST DISTANCE
FROM THE BOTTOM OF
TOP SLOT TO TOP OF
PART. INSTALLATION OF
PARTS BECOMES EASIER
MOVING SOUTH.

The image is a 3D CAD model of a mechanical assembly. It features a stack of plates held together by two horizontal pins. The top plate is yellow, and the bottom plate is red. Between them are several thinner plates in various colors (blue, green, orange, etc.). The assembly is mounted on a dark grey base. The background is a light blue gradient. The text is in a white box on the left side of the image.

PLATE 9
VIEW 10

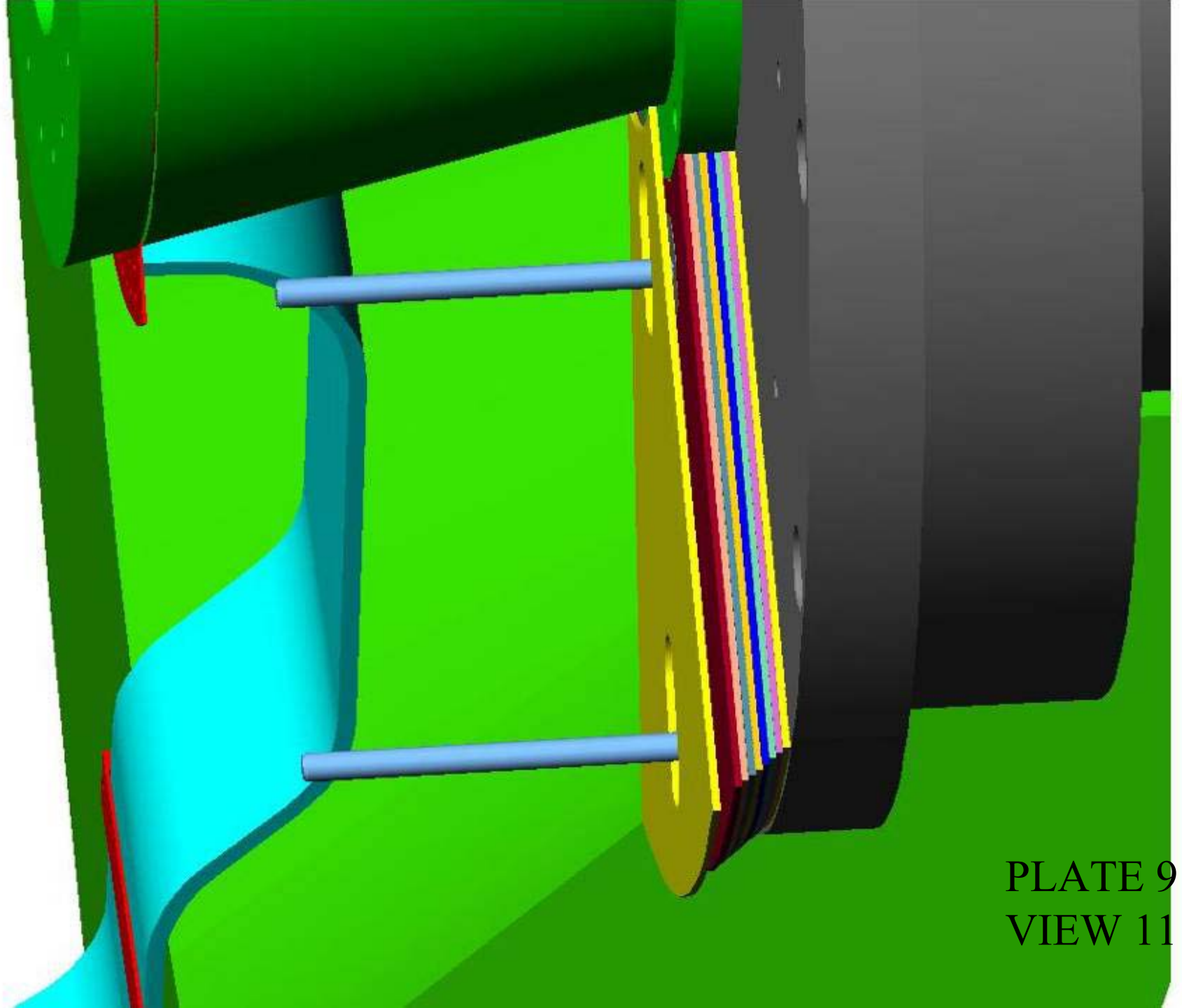


PLATE 9
VIEW 11

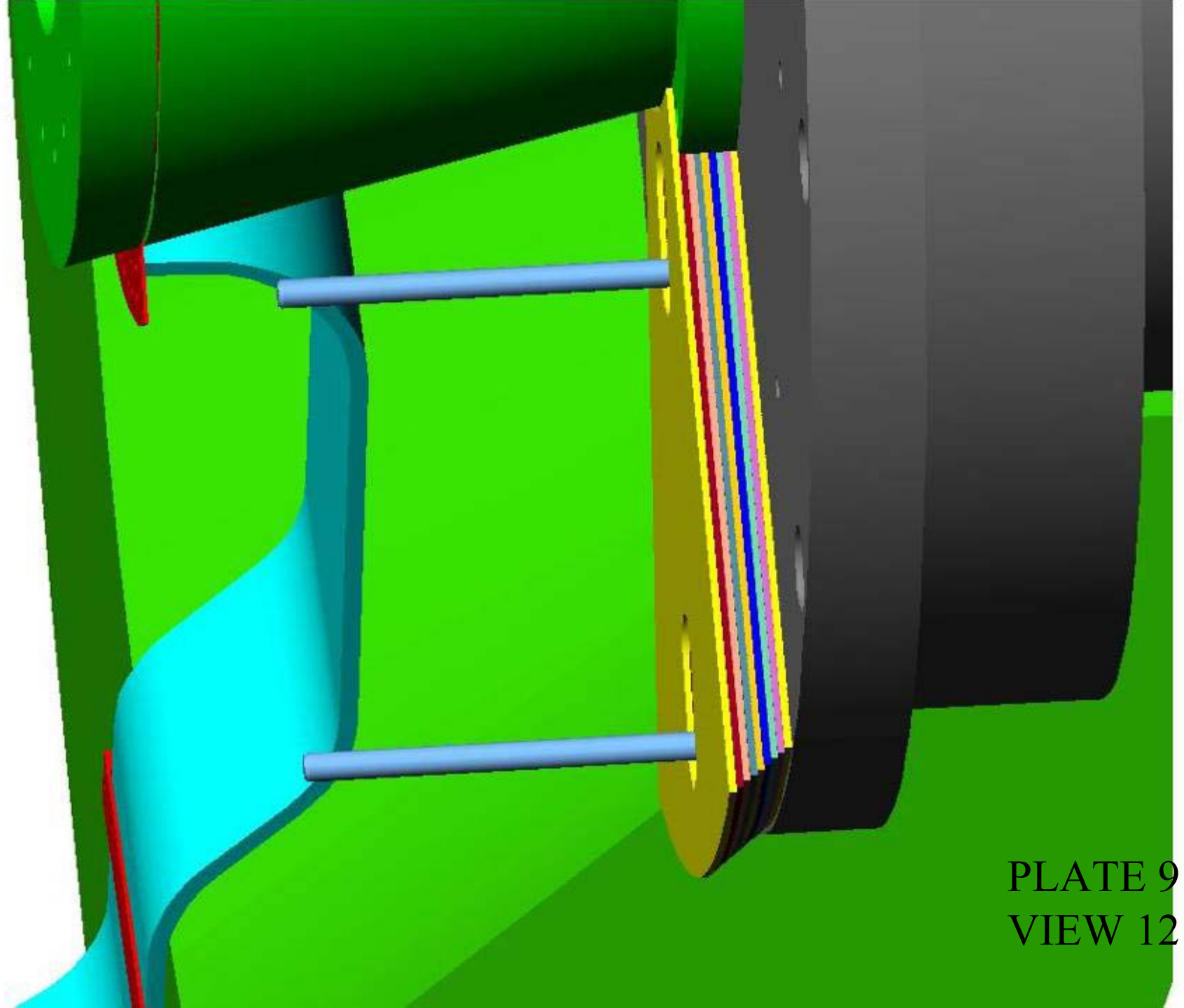


PLATE 9
VIEW 12

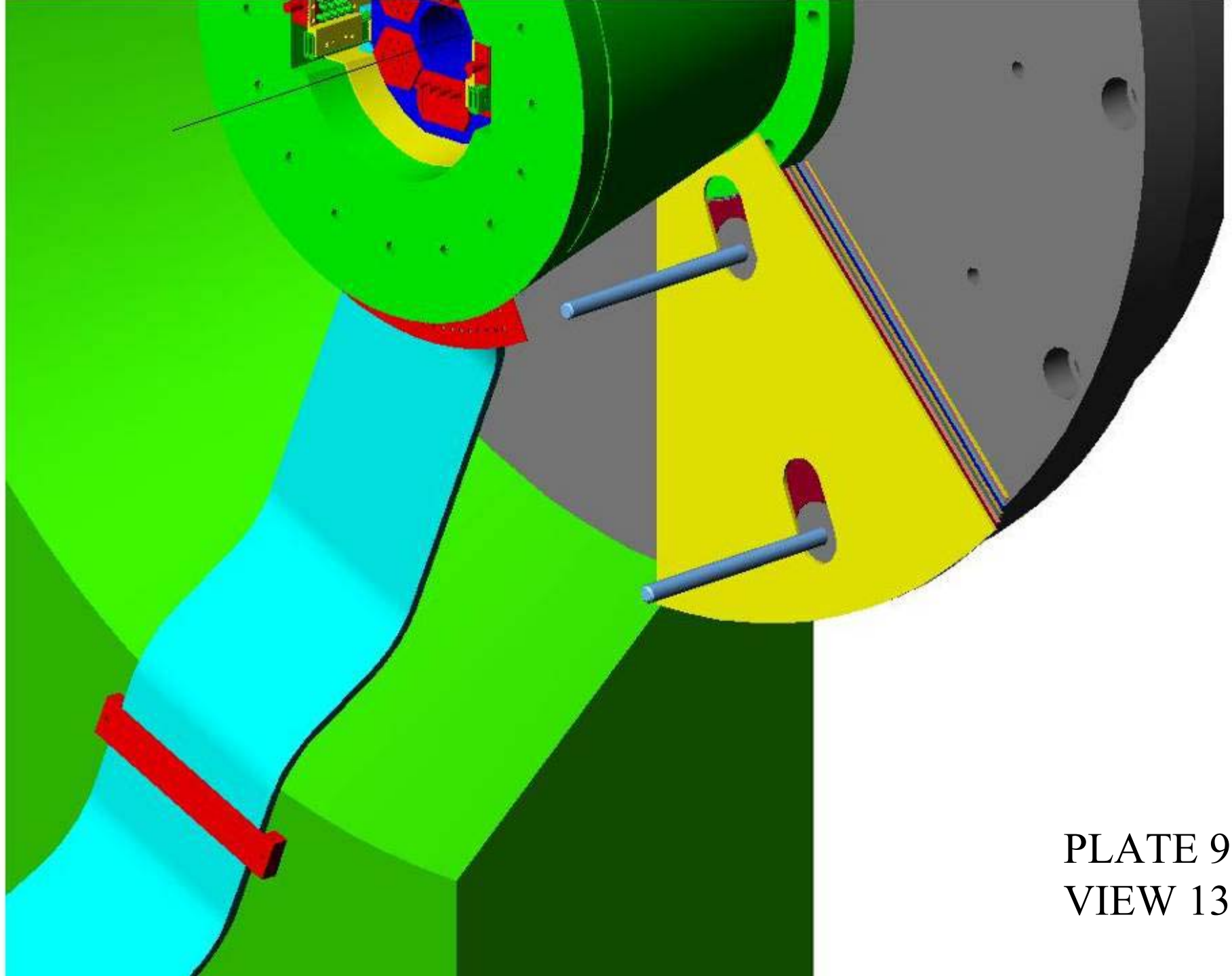


PLATE 9
VIEW 13



A 3D CAD model of a mechanical assembly. The assembly consists of several components: a large green ring-like part at the top, a yellow conical part on the right, a grey cylindrical part on the far right, and a cyan curved part at the bottom. A red rectangular plug is visible on the cyan part. Two blue pins with pink slot-shaped plugs are shown passing through the yellow and grey parts. A callout box with the text 'SLOT SHAPED PLUGS' has two arrows pointing to the pink plugs. The top of the green part has a blue and red internal structure.

SLOT
SHAPED
PLUGS

PLATE 9
VIEW 14

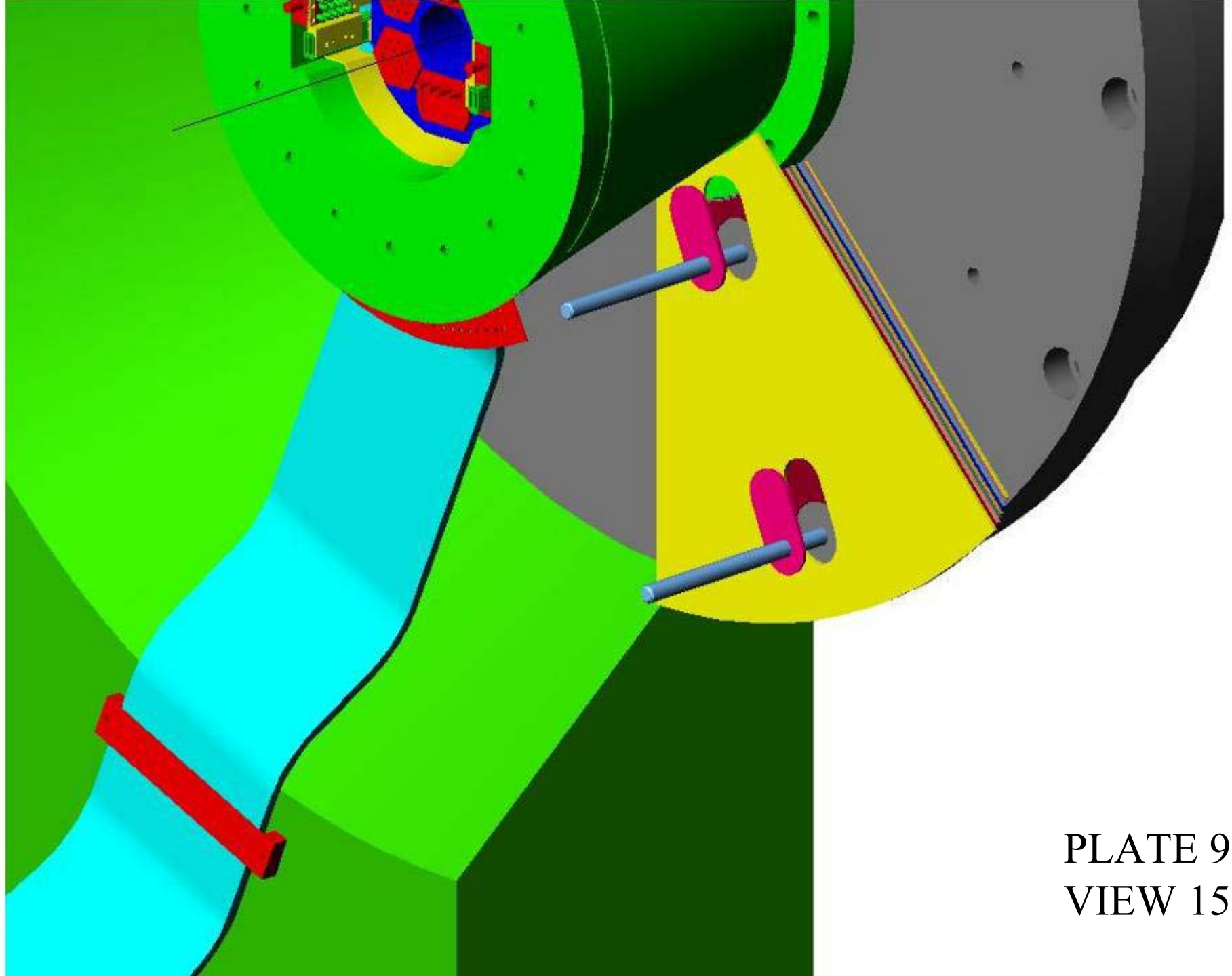


PLATE 9
VIEW 15

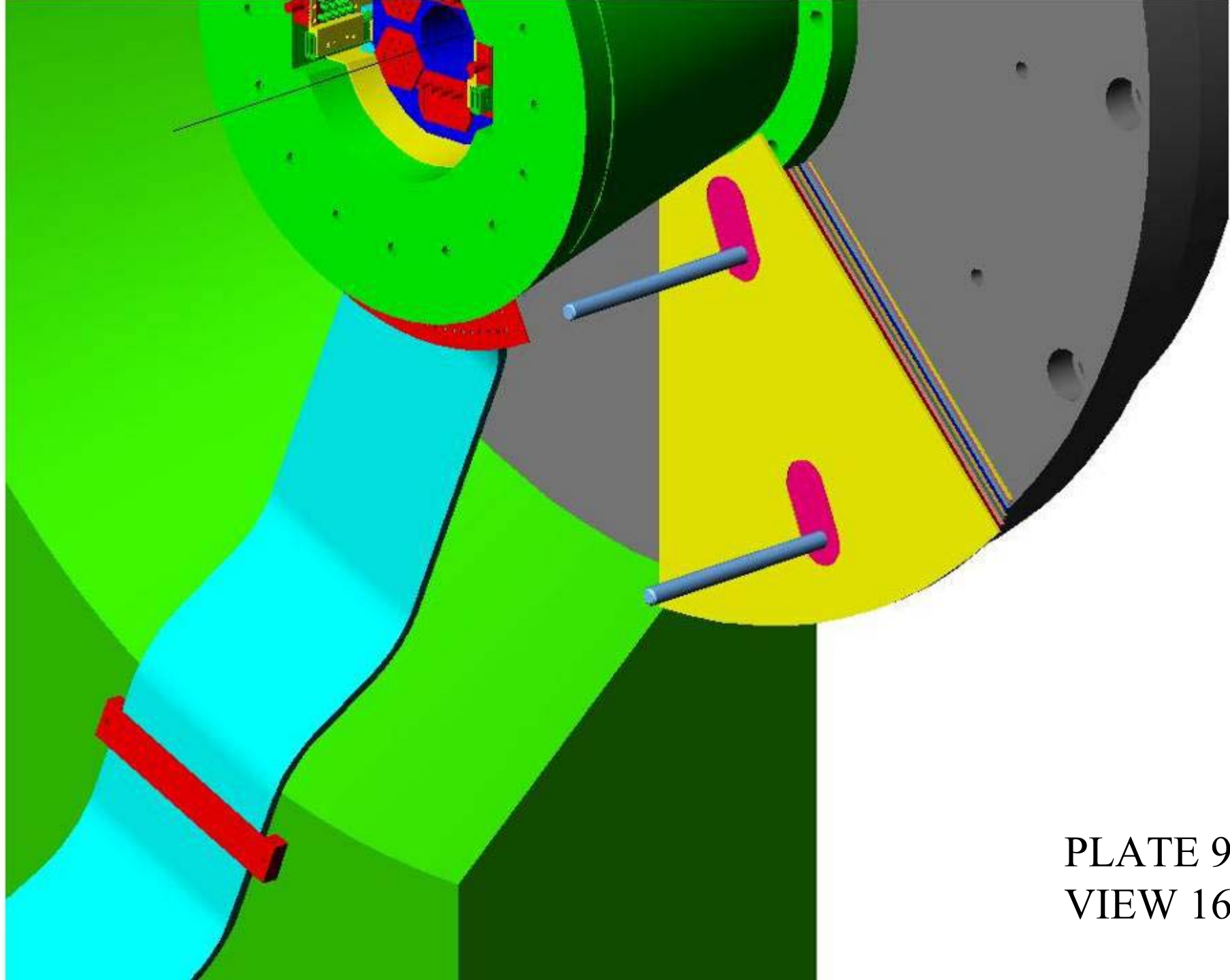
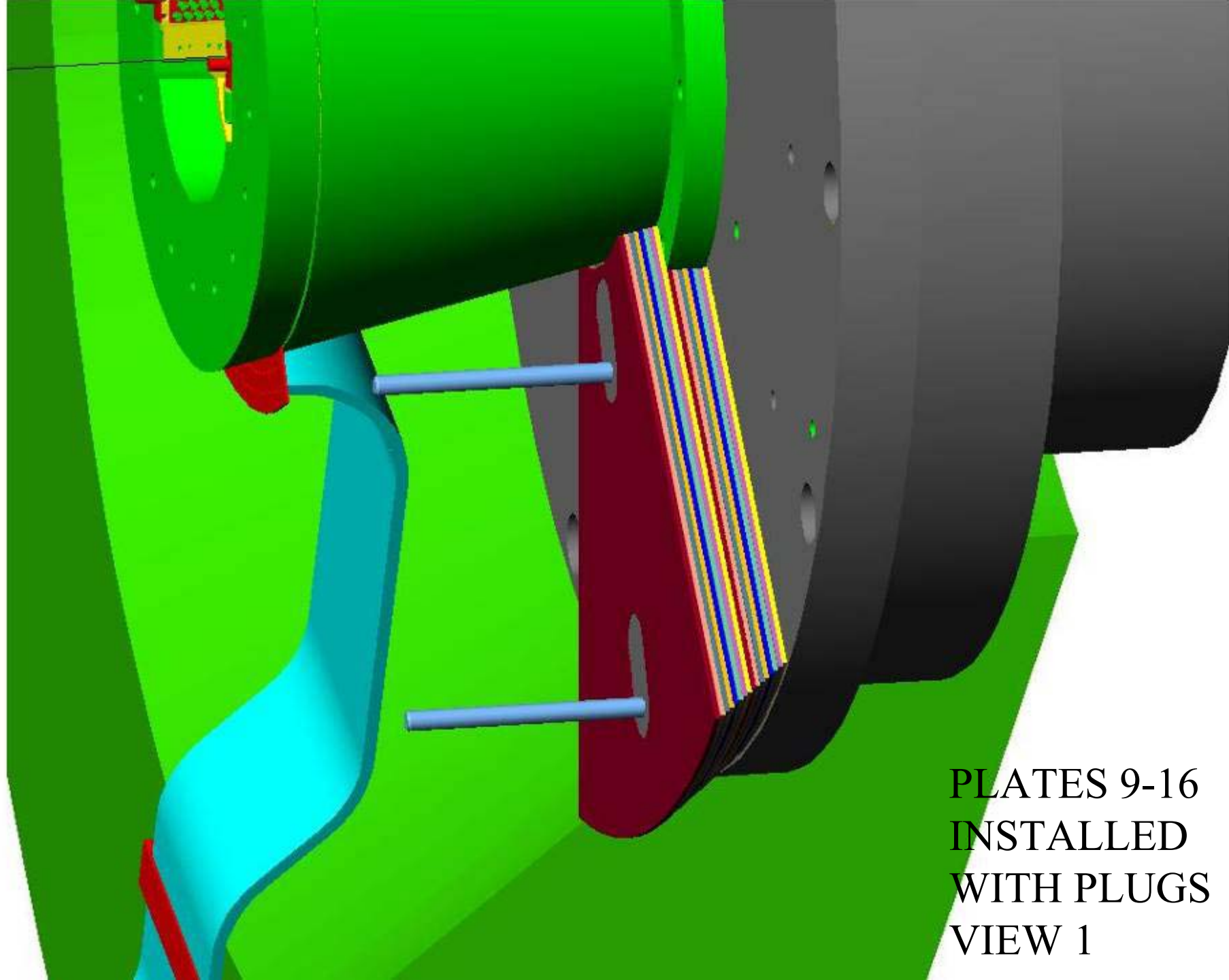
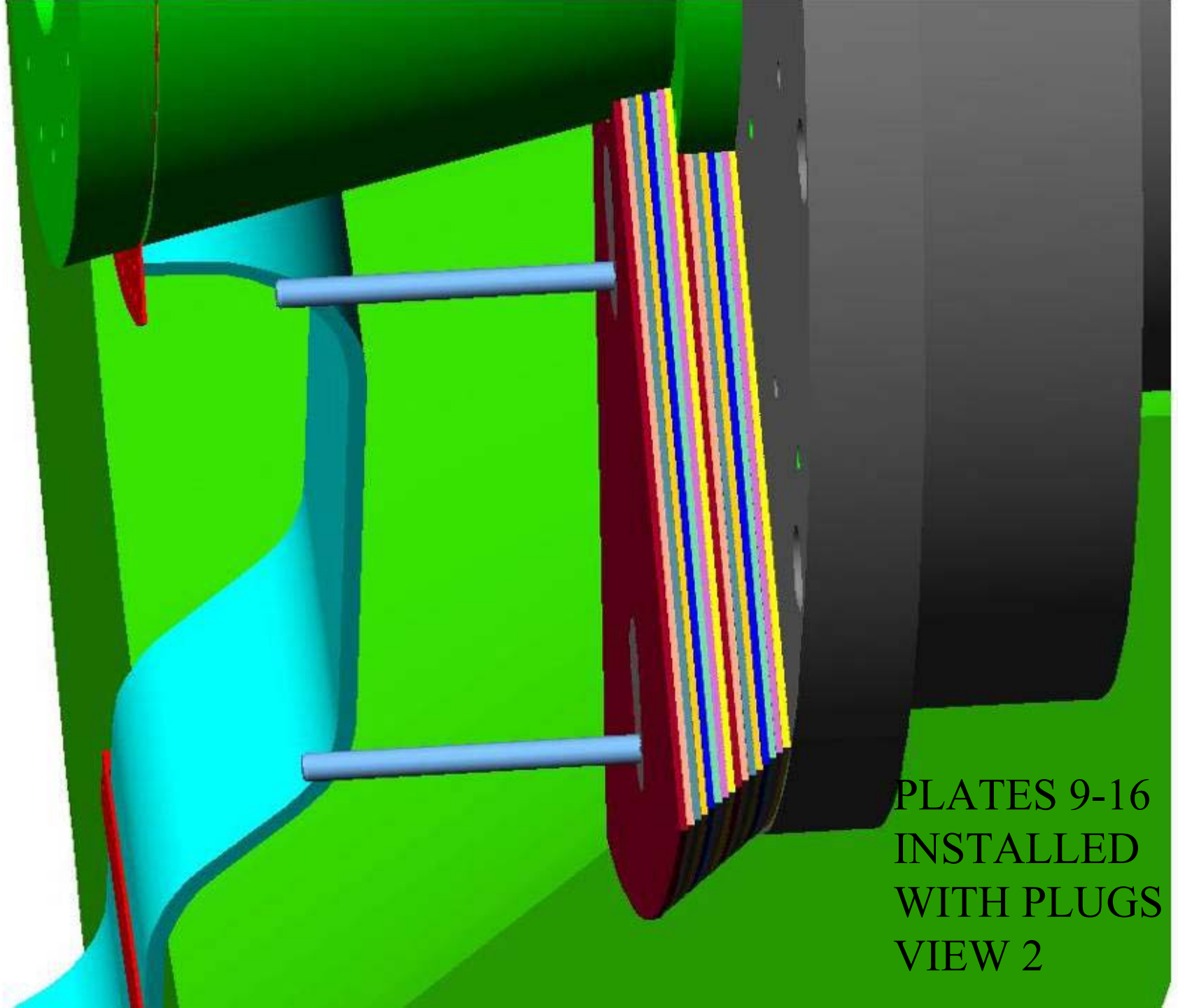


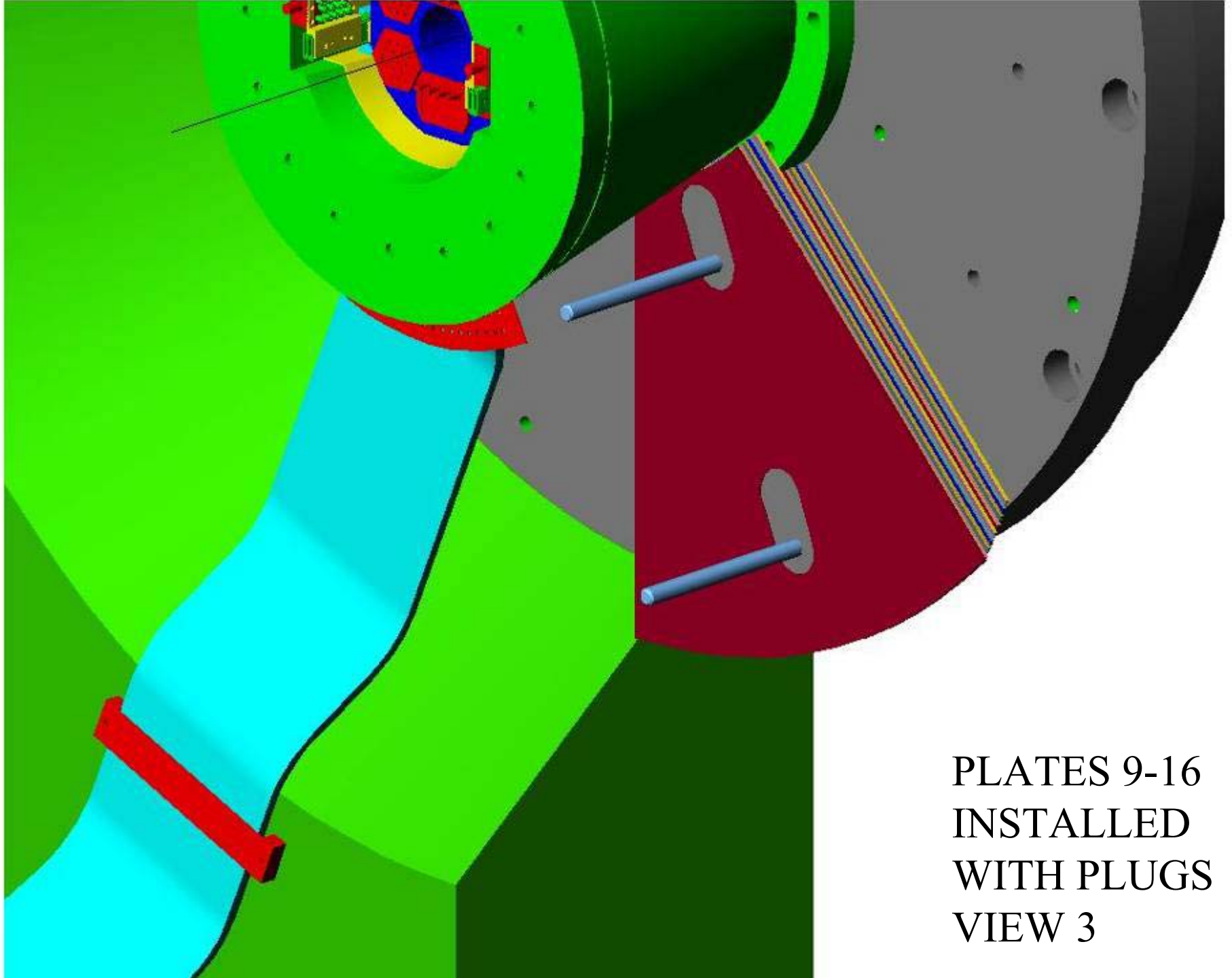
PLATE 9
VIEW 16



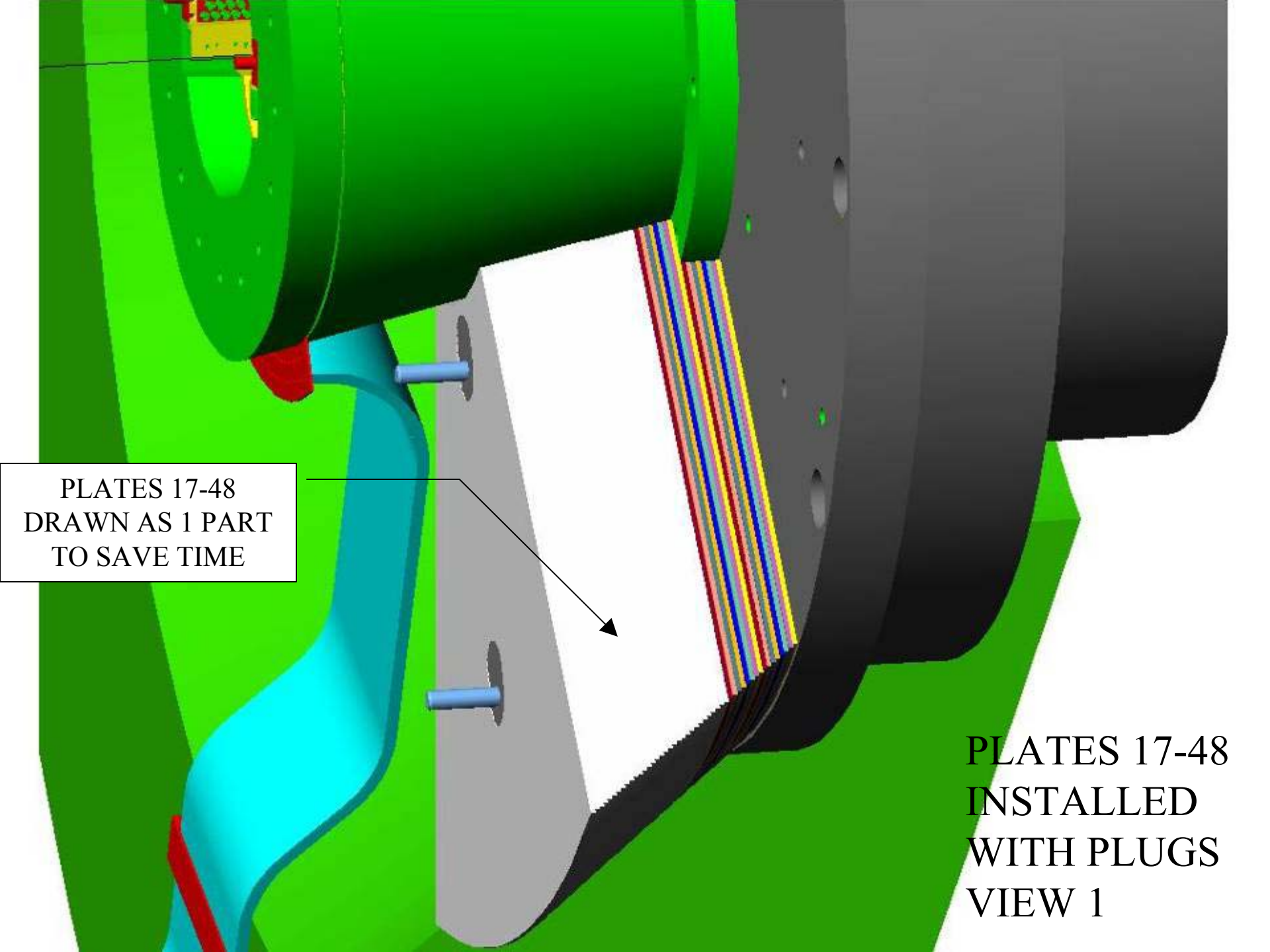
PLATES 9-16
INSTALLED
WITH PLUGS
VIEW 1



PLATES 9-16
INSTALLED
WITH PLUGS
VIEW 2

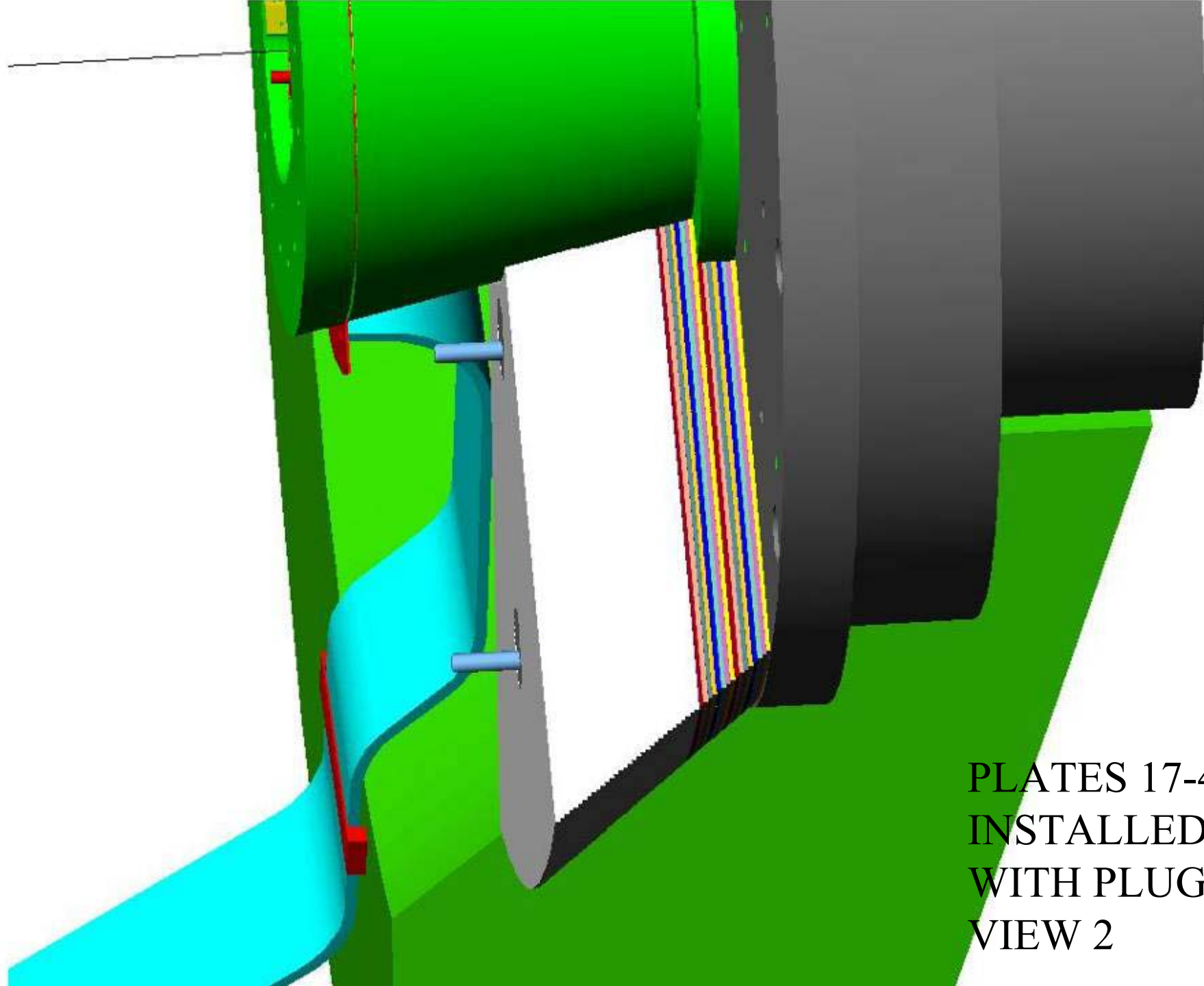


PLATES 9-16
INSTALLED
WITH PLUGS
VIEW 3

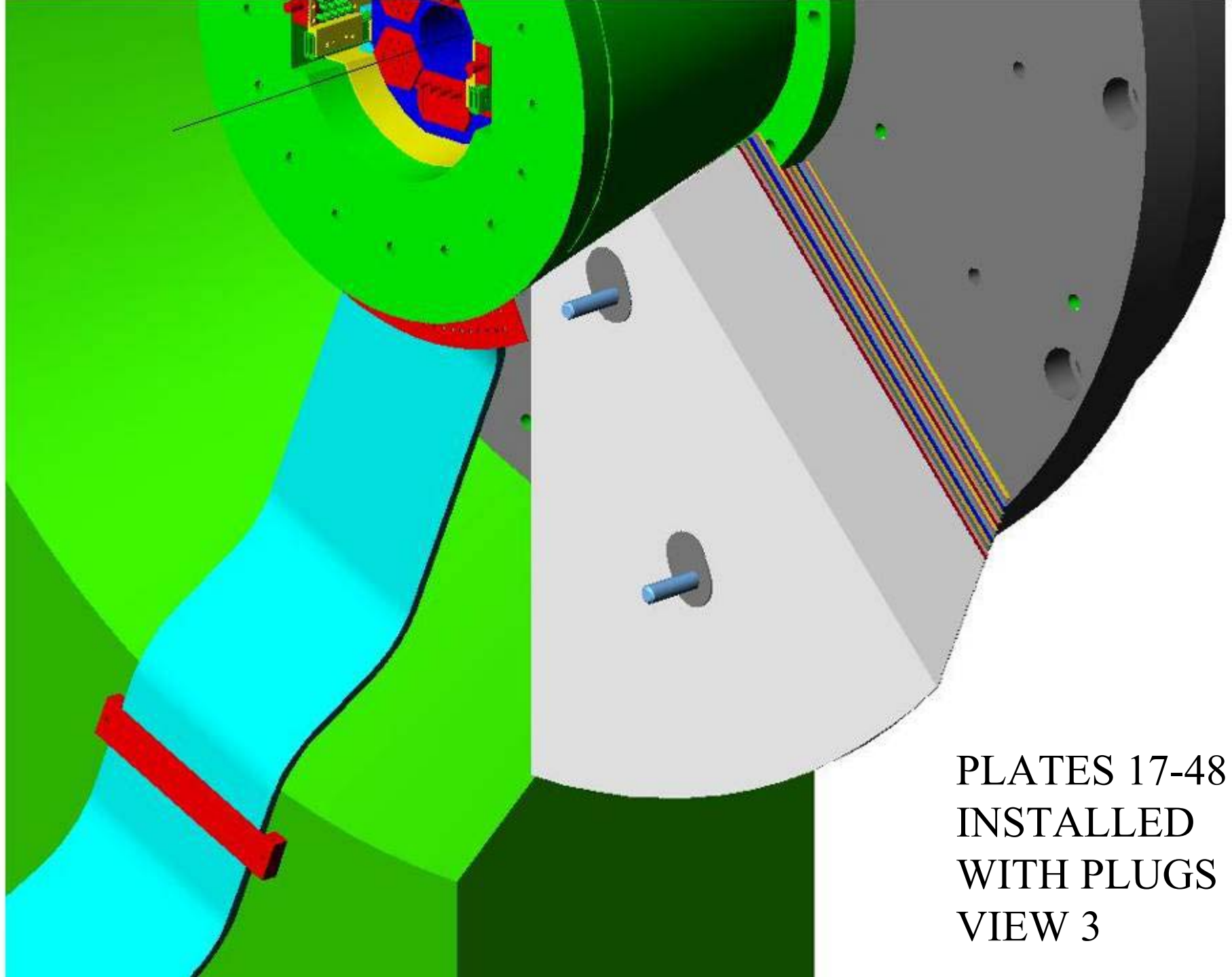


PLATES 17-48
DRAWN AS 1 PART
TO SAVE TIME

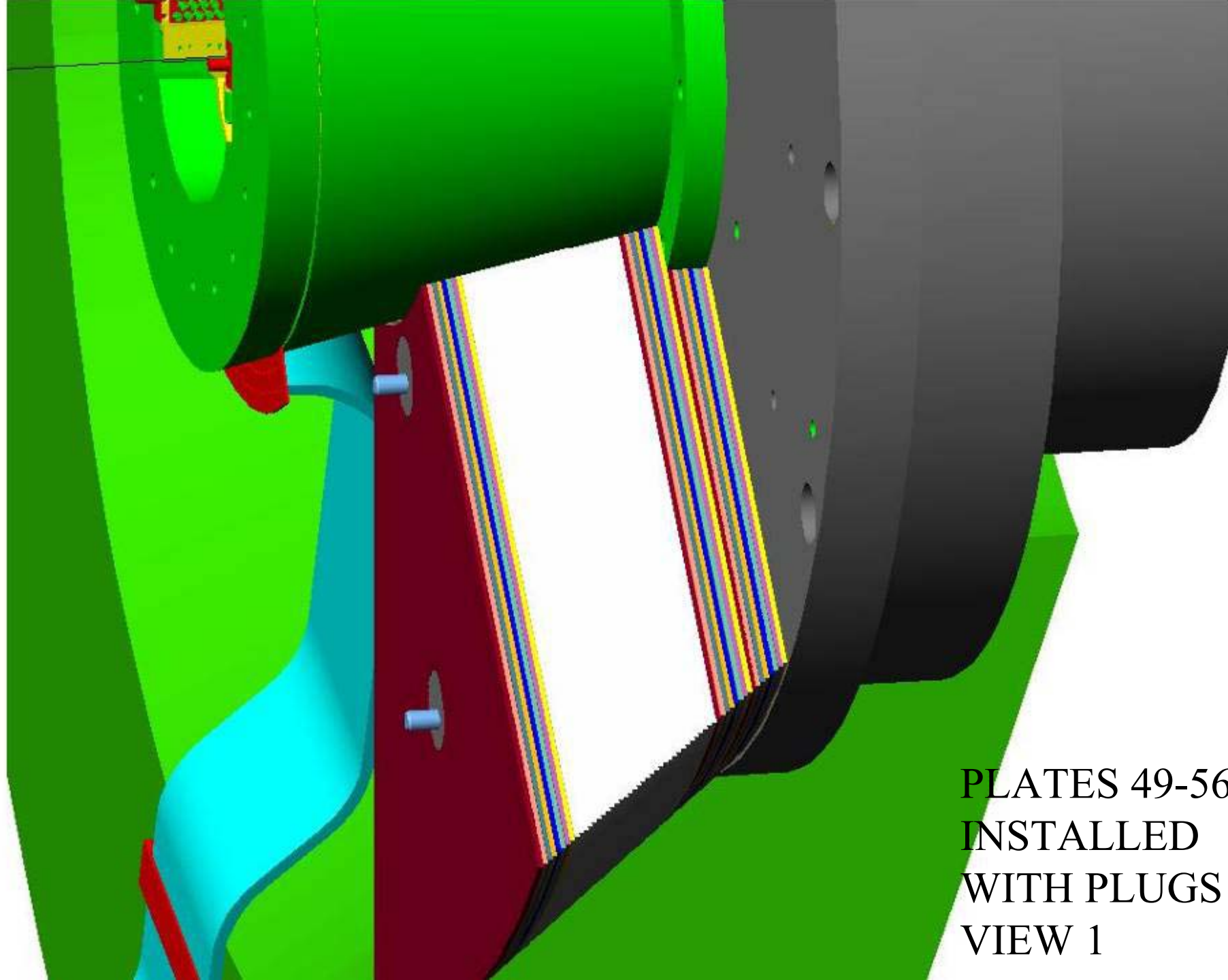
PLATES 17-48
INSTALLED
WITH PLUGS
VIEW 1



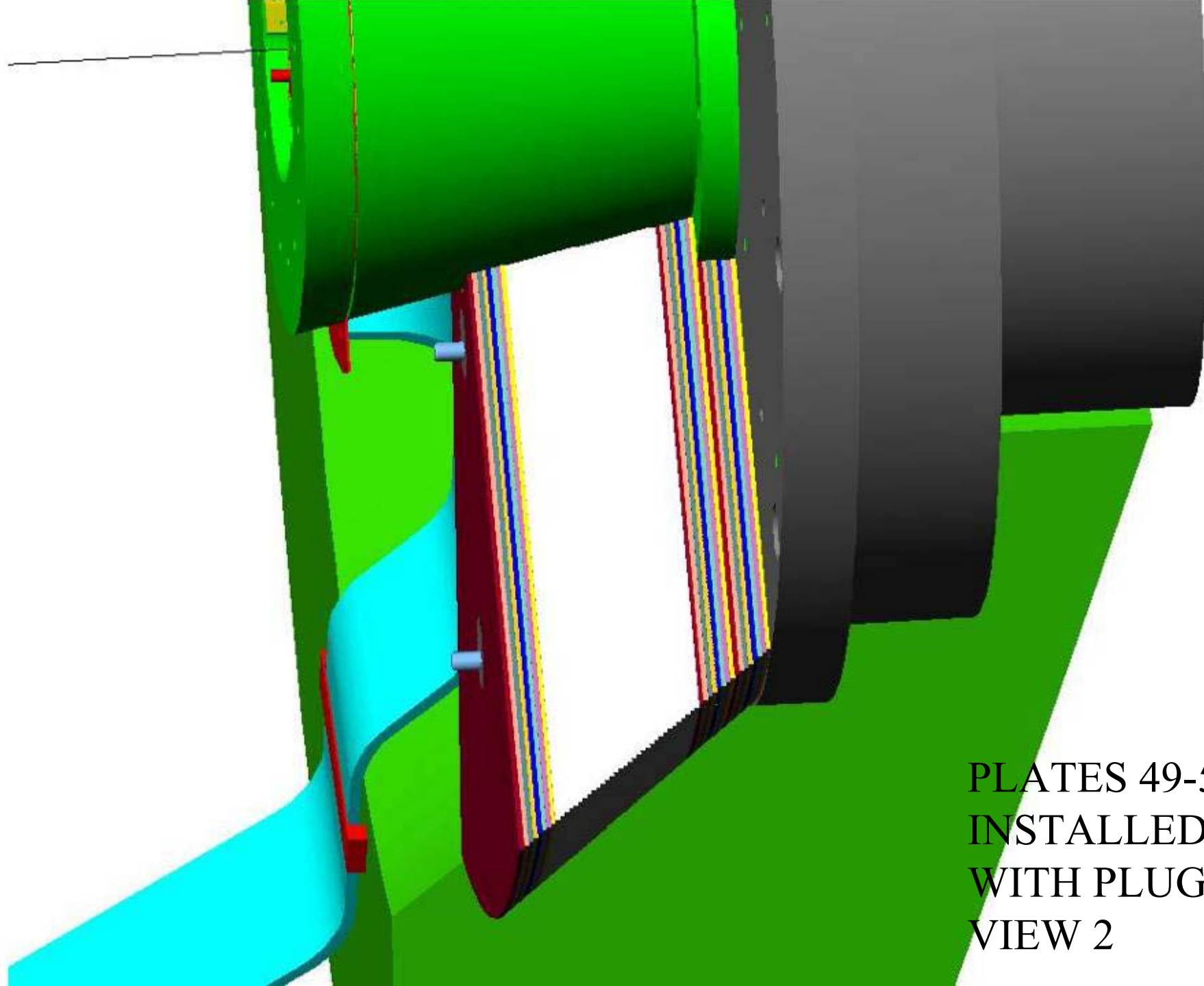
PLATES 17-48
INSTALLED
WITH PLUGS
VIEW 2



PLATES 17-48
INSTALLED
WITH PLUGS
VIEW 3



PLATES 49-56
INSTALLED
WITH PLUGS
VIEW 1



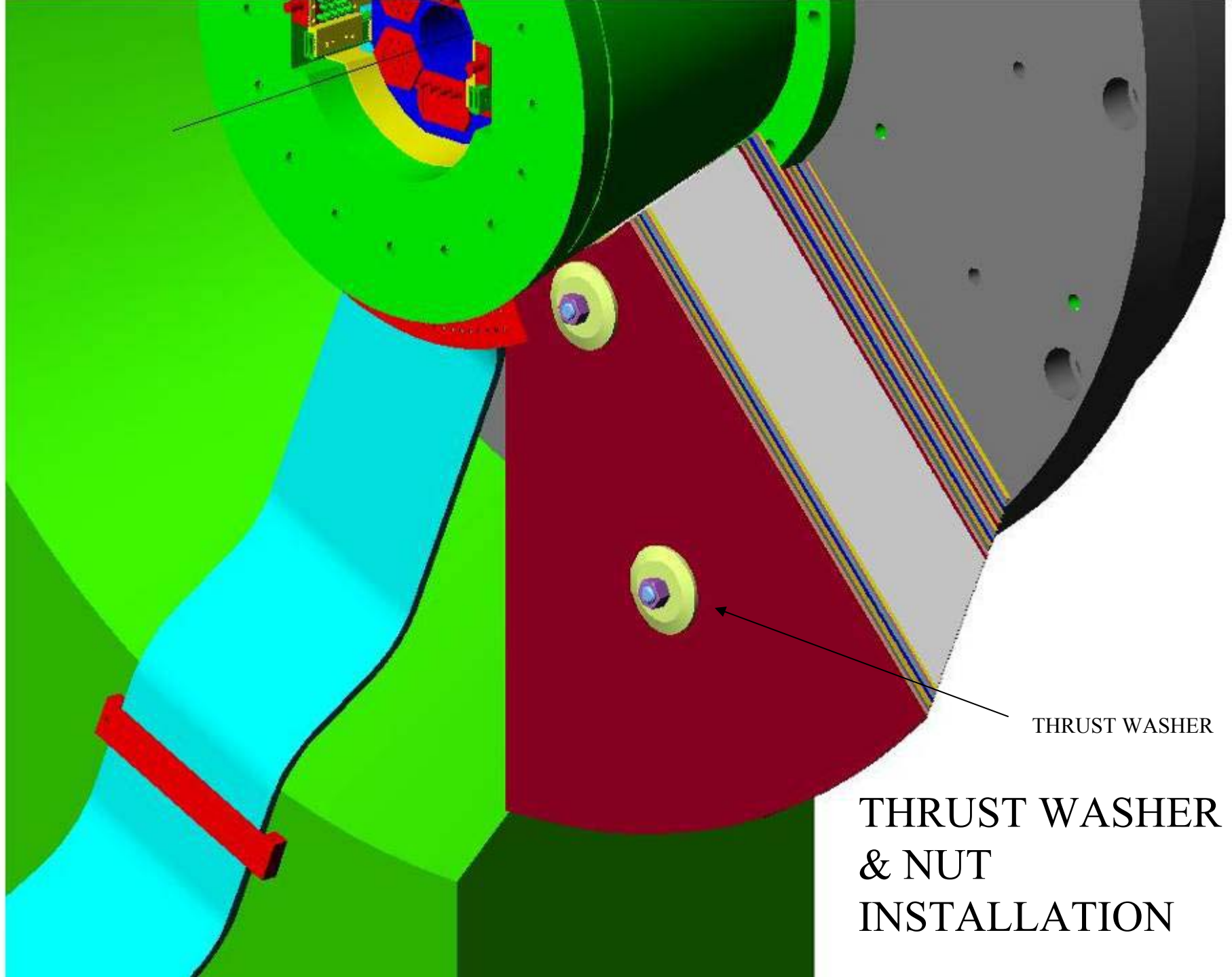
PLATES 49-56
INSTALLED
WITH PLUGS
VIEW 2



PLATE 56 IS OUR
HEAVIEST PART AT 52
POUNDS

The image is a 3D CAD model of a mechanical assembly. It features a central hub with a blue and red internal structure. Surrounding this hub are several plates of different colors: a large green plate at the top, a cyan plate on the left, and a large red plate at the bottom right. A grey plate is visible on the right side. A red rectangular component is attached to the cyan plate. Two blue cylindrical plugs are shown inserted into the red plate. A black line runs along the interface between the cyan and red plates. A text box with a black border and white background is positioned on the left, with an arrow pointing to the red plate. The overall design is complex and industrial.

PLATES 49-56
INSTALLED
WITH PLUGS
VIEW 3



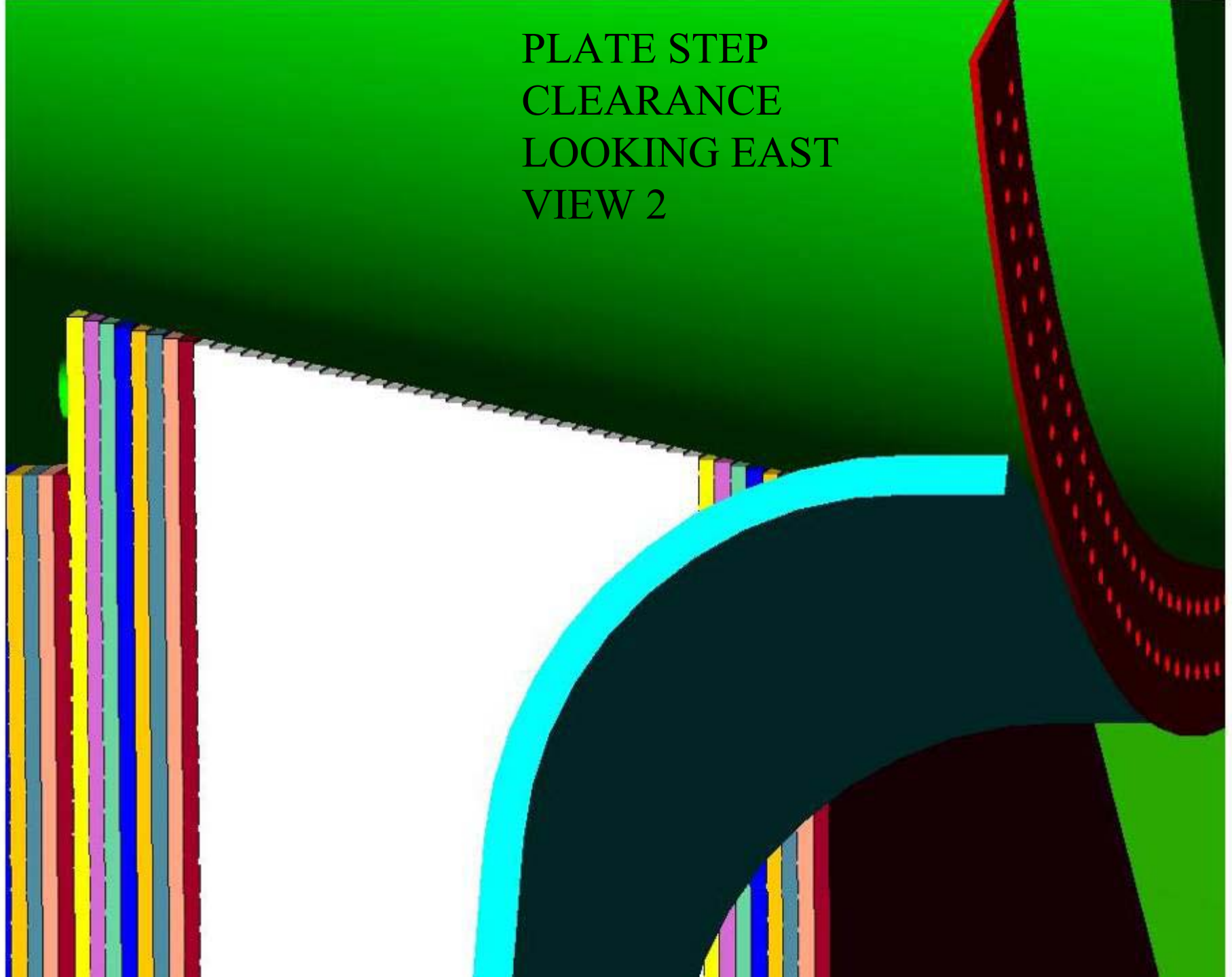
THRUST WASHER

THRUST WASHER
& NUT
INSTALLATION



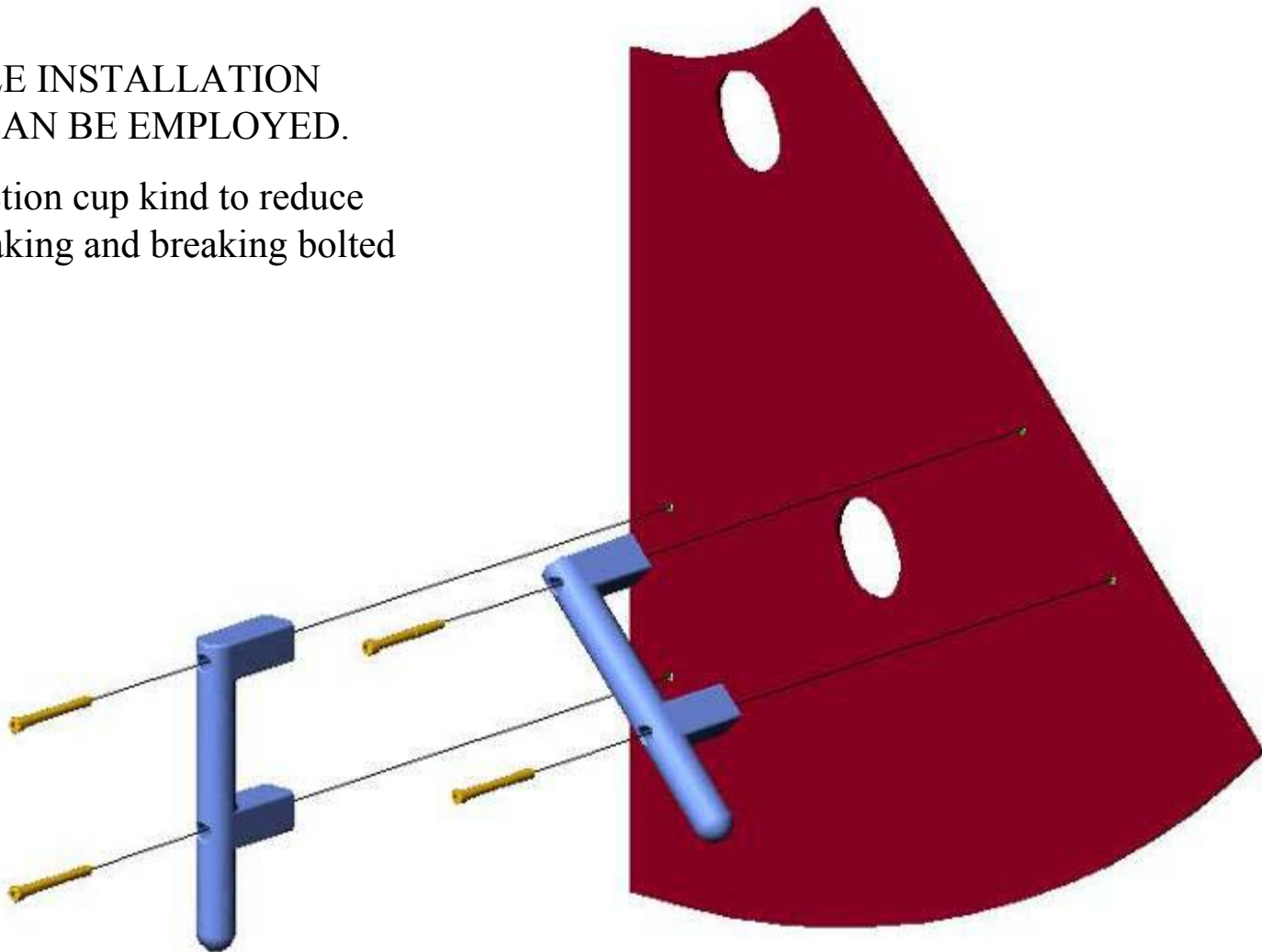
PLATE STEP
CLEARANCE
LOOKING EAST
VIEW 1

PLATE STEP
CLEARANCE
LOOKING EAST
VIEW 2

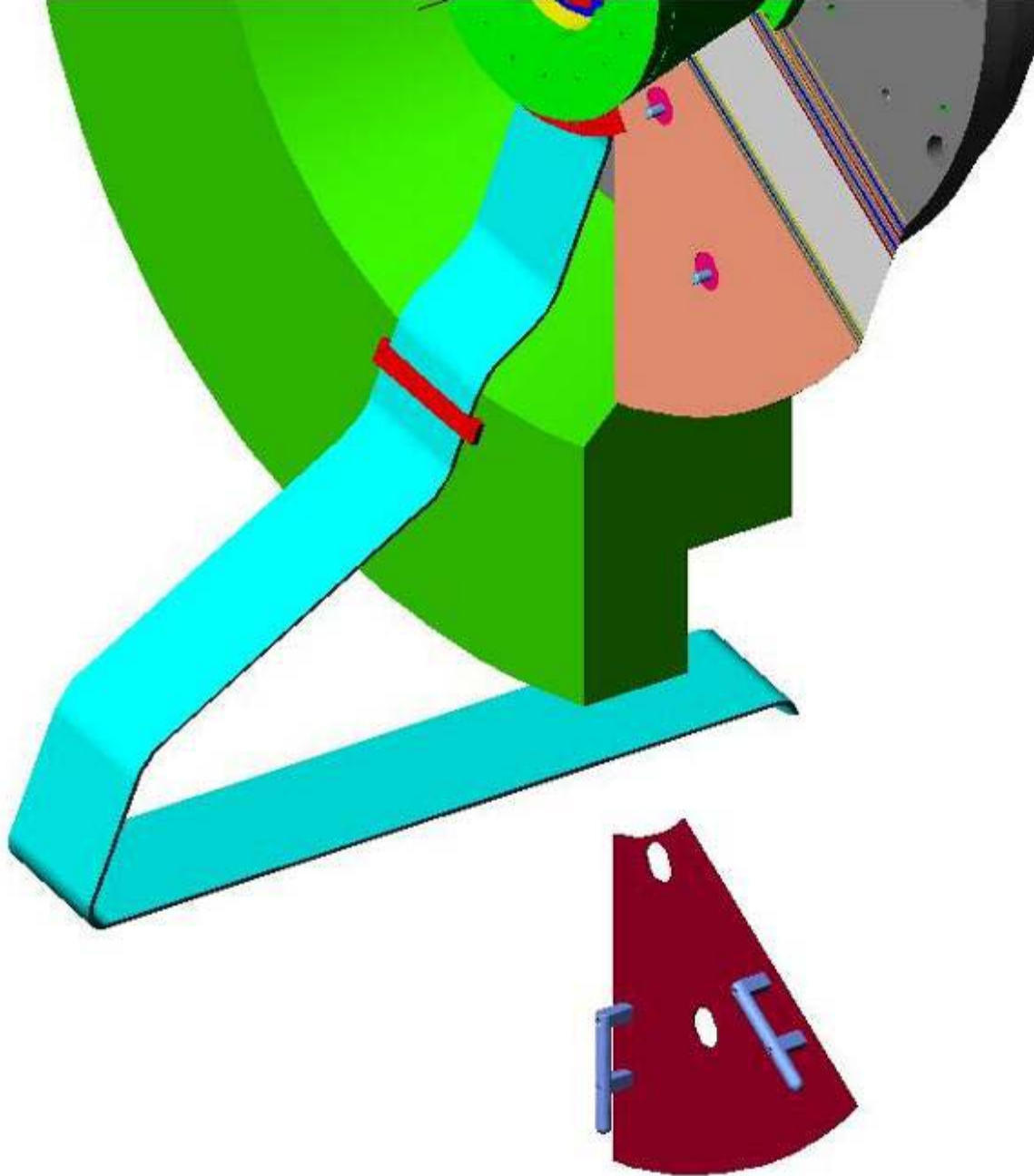


REMOVABLE INSTALLATION
HANDLES CAN BE EMPLOYED.

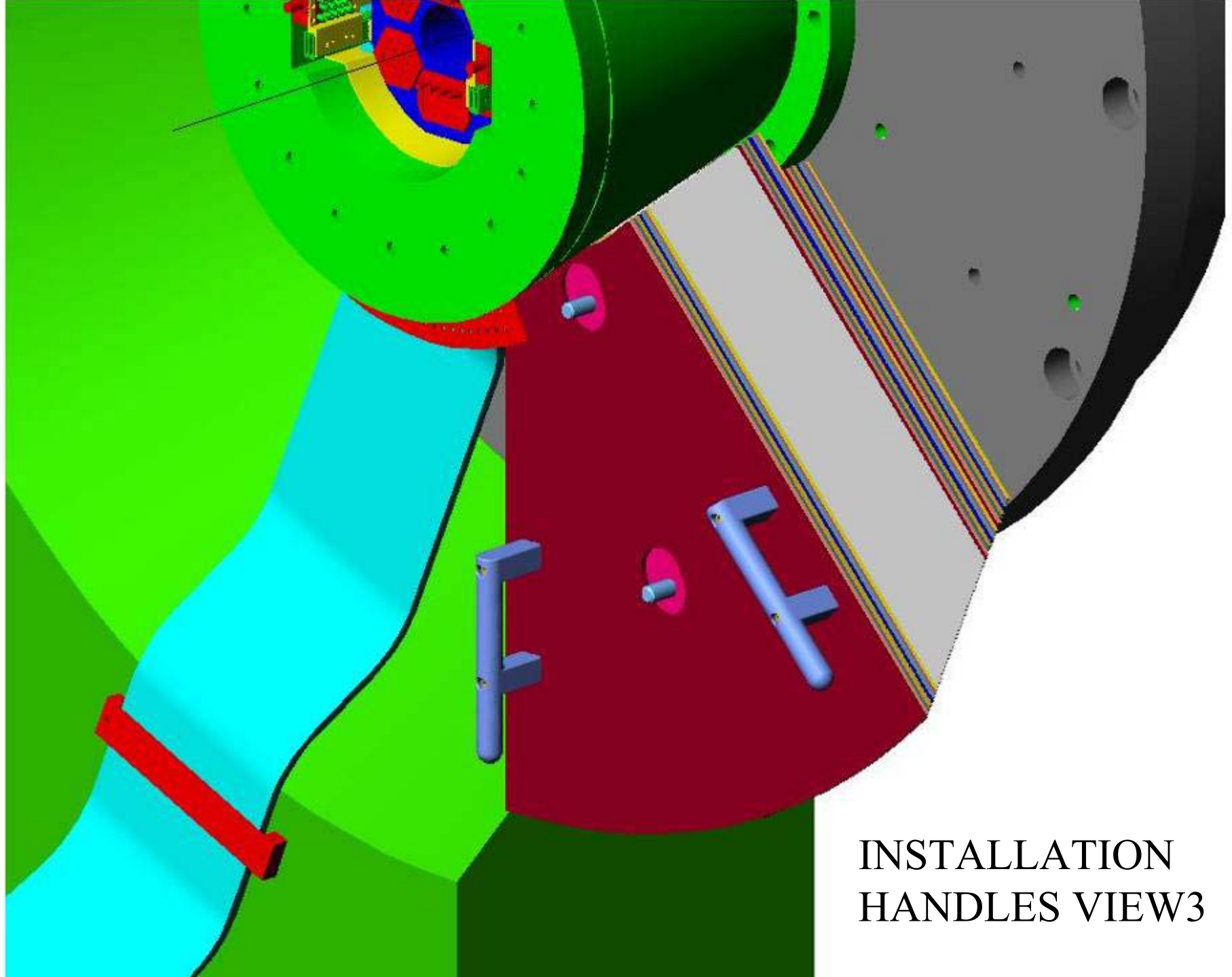
(Could be suction cup kind to reduce
time spent making and breaking bolted
connections.)



INSTALLATION
HANDLES VIEW1



INSTALLATION
HANDLES VIEW2



INSTALLATION
HANDLES VIEW3

Pros:

- Parts are light enough to be installed by hand.
- Does not require a complicated lifting fixture to be designed and constructed.
- Does not require crane coverage.
- Parts are thin enough to not require a conical cut to be machined on the radial edges.
- As thin metal plate, they can be manufactured by means of laser or water jet cutting; which are a possible time/cost savings
- Simple installation concept reduces potential for injury or damage to equipment.
- Less tapped holes are required in Central Magnet Center Plug.

Cons:

- Lots of parts
- It's a lot of parts that aren't held up by anything but friction
 - NO!*
 - May need to consider glue or other mechanical means to keep parts from sliding down rod
 - If the rod deflects enough for the plates to touch the steel cone at the bottom, they will be pushed out by cone action
- See next pages for analysis of this design idea

Analysis

- Larry calculated the stress in the top steel rod holding up a copper absorber
- 1" dia rod is too small, bending stress in rod is 188 ksi
 - If you used an alloy steel that could handle the stress, the deflection would be .62" at end of rod—too large
- A 2.25" dia rod lowers the stress to 21.6 ksi, the bending allowable for A36 steel rods
 - Deflection = .024" This is fine

Threading the magnet

- The preceding analysis implies that we would have to bore the magnet for one tapped hole that is 2.250"-4.5 UNC thread
 - We might need a 6 or 8 pitch UN thread if the minor diameter is too small (another calc)
 - It needs to be tapped 3.38" deep at least
- This is a humungous hole to drill and tap in the magnet
- Would we want to weld the top rod to the magnet?

More comments

- The top rod carries the weight of the plates
- The bottom rod only prevents the plates from rotating around the top rod to get their CGs right below the top rod
 - The bottom rod could be smaller in diameter since its load is much less
- There was some discussion of making the plates of steel. What material do you want the absorber in, copper or steel?
 - Steel is lighter (SG=7.86, Cu SG= 8.94)
 - This calculation assumed steel support rods and copper plates
 - If you need it to be all copper, the rods would have to get larger because copper is weaker (can't weld it either)

Conclusion

- I think Chris' idea of the secondary plugs is a pretty clever way to use cantilevered rods when the plates need to move along a cone
- I am nervous about standing next to this assembly before the final nuts are tightened down.
 - We need to be sure it is completely safe to execute
- Tell us what you think

Prototype C tests underway

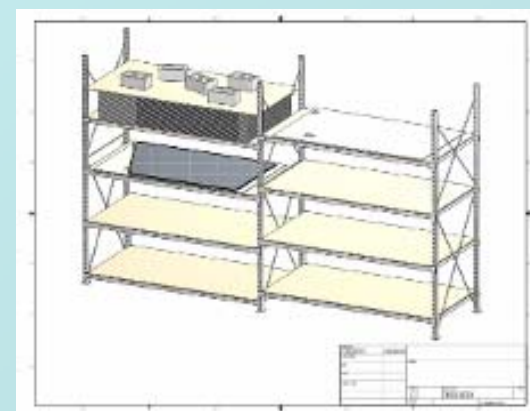
Prototype D in design/fabrication

Additional equipment needed:

transport table

$\frac{1}{2}$ octant/module/gap storage racks

$\frac{1}{2}$ octant handling and transport fixtures



1. Procurement of new Electrical or Other Equipment:

When procuring items or products that are required to be Nationally Recognized Test Laboratory (NRTL) important that vendors assure items are authentic, marked and identified by a NRTL. This is more than just electrical equipment. e.g. scaffolds. Both OSHA and National Electric Codes refer to the use of tested and listed equipment. Certificates of Compliance/Letters of Conformance are taken seriously and vendor must be certain that items sold to DOE contractors meet the specified requirements.

2. New Pressure Vessels require an ASME Stamp, usually a U-stamp:

New pressure vessels, or vacuum vessels that could possibly be backfilled with a gas that could cause >15 psig pressure in the vacuum vessel, must have a U-stamp or must be designed in accordance with ASME Code and the design and fabrication reviewed by and approved by a qualified independent design professional (i.e., professional engineer). Consult BNL experts for more requirements.

3. Latest injury report 0 DART, 0 DOE recordable and First aid cases

Climbing through equipment, lost balance scraped knuckles - first aid

Using mouse felt pain and tingling in thumb and arm - first aid

Car rear ended while driving to SUNY SB, 1 whiplash, 1 air bag burn on wrist - info only

Leaned over felt back pain - first aid

Lifting tray felt pain in wrist - first aid

Removing sign from door, plastic piece snapped off, cut below eye - first aid

- | | |
|------|---|
| 2008 | Install stations 1 & 2 of MuTr FEE upgrades (north), 1 octant Cu absorber (S), 1 half otants each RPC2/3 S, MMN sta. 2 scaffolding, MuTr Sta 1 N&S scaffolding, 1 octant of MuTrigger FEE upgrades (south, sta 1 & 2), MuTr N stn. 1 & 3 decaps, MuTrigger rack platforms (N&S), CM crane, remove/replace beampipe, infrastructure upgrades & repairs, misc. subsystem work, 1 RPC rack in South tunnel, MuTrgr FEE N & S racks |
| 2009 | Remove HBD & RXNP, scaffolding in MMS, MuTr S stn. 1 & 3 decaps, RPC2 N, RPC3 N, north Cu absorbers, partial VTX, iFVTX, MuTrgr S sta 1 & 2, MuTrgr S rack, 2 racks in N tunnel, infrastructure upgrades & repairs, misc. subsystem work |
| 2010 | Remainder of VTX barrel, partial FVTX, south Cu absorber completed, MuTrgr FEE stn. 3 S, any remaining MuTr decaps, infrastructure upgrades & repairs, misc. subsystem work |
| 2011 | RPC1 N&S, NCC N, remainder of FVTX, DC West upgrade/repair, remove absorbers, infrastructure upgrades & repairs, misc. subsystem work |
| 2012 | NCC S, upgrades contingency & wishlist, infrastructure upgrades & repairs, misc. subsystem work, TBD new and improved upgrades |

** Years refer to the shutdown year and follow the run with the similar number (i.e. work in 2008 is to be done in the shutdown that follows run 8, and so on)*

Where To Find PHENIX Engineering Info



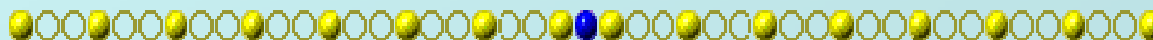
Spring is Sprung! Today is the first day of spring.

We made it through another winter!

And



Links for the weekly planning meeting slides, long term planning, pictures, videos and other technical info can be found on the web site:



http://www.phenix.bnl.gov/WWW/INTEGRATION/ME&Integration/DRL_SSint-page.htm